

CANADIAN ELECTRIC UTILITIES

Analysis of Generation and Trends 1989



National Energy Board



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DEFINITIONS* AND ABBREVIATION OF TERMS

- Power:** Power is the rate of delivery of energy and is measured in watts (W). (Electric energy is measured in watt hours.)
- Capacity:** In the electric power industry, this word has two meanings:
1. Power, that is, the rate of delivery of energy. For example, a utility might sell 50 megawatts of capacity, i.e. of power.
 2. The maximum quantity of power that some piece of equipment is capable of carrying. For example, a generating unit might have a rated capacity of 50 megawatts.
- Energy:** The capacity of doing work.
- Electrical**
- Energy:** Energy in the form of electricity, normally expressed in units of watt hours or decimal multiples of watt hours.
- Power:**
- | | | |
|------------------|---|------------------|
| "kW" - kilowatts | = | 1 000 W |
| "MW" - megawatts | = | 1 000 kW |
| "GW" - gigawatts | = | 1 000 000 kW |
| "TW" - terawatts | = | 1 000 000 000 kW |
- Energy:**
- | | | |
|-------------------------|---|--------------------|
| "kW.h" - kilowatt-hours | = | 1 000 W.h |
| "MW.h" - megawatt-hours | = | 1 000 kW.h |
| "GW.h" - gigawatt-hours | = | 1 000 000 kW.h |
| "TW.h" - terawatt-hours | = | 1 000 000 000 kW.h |

*Definitions are from "Electric Power: A compendium of terms" - Information Bulletin 8 - May 1985 - National Energy Board.

(ii)

NOTE ON METRIC CONVERSION

The following table provides some conversion factors and metric equivalents, which are included to assist readers who may wish to convert information into Imperial Units.

Approximate Conversion Factor

S.I. Units

Imperial Units

1 cubic metre (m ³)	=	35.3 cubic feet
1 cubic metre (m ³)	=	6.3 barrels
1 litre (L)	=	0.22 gallon
1 kilogram (kg)	=	2.208 pounds
1 metric tonne	=	1.1023 short tons
1 gigajoule (GJ)	=	0.95 million British thermal units

Metric Equivalents

1 megagram	=	1 metric tonne
1 kilolitre	=	1 cubic metre

INTRODUCTION

This report covers the net generation of electricity by Canadian electric utilities during the calendar year 1989 and gives totals for Canada with the breakdown by province, together with an analysis of fuel consumption, fuel costs and thermal generating plant heat rates. Historical trends for the period 1985 to 1989 inclusive are described. The report uses data submitted by the electric utilities to Statistics Canada. The Board received the final 1989 data from Statistics Canada in June 1991.

The analysis presented in Sections 1 to 4 of this report does not include the 39 224 GW.h (8.1 percent of the Canadian total) that were generated in 1989 by approximately 6 129 MW of installed capacity owned by industrial establishments. In Section 5, the industrial generation is shown on net generation and consumption graphs in order to present the complete picture.

Since the report deals with net station output to the electric utility systems, excluding station service, negative generation figures occur occasionally where a plant has used more electricity than it produced.

1. UTILITY GENERATION IN CANADA

The total Canadian utility installed capacity at the end of 1989 was 95 948 MW; the corresponding energy generation was 444 494 GW.h. Table 1.A shows the distribution of the installed capacity and energy production by primary energy source.

TABLE 1.A

CANADIAN UTILITY GENERATION BY PRIMARY ENERGY SOURCE

FUEL TYPE	CAPACITY		ENERGY	
	(%)	(MW)	(%)	(GW.h)
Fossil	30.4	29 169.9	24.7	109 883.5
Hydro	56.5	54 174.9	58.3	259 230.7
Uranium	13.1	12 603.0	17.0	75 379.7
Total	100.0	95 947.8	100.0	444 493.9

The installed capacity in each province at the end of 1989 and the energy generation in each province in 1989 are summarized in Table 1.B below. Detailed information is given in the Appendix. Each province's total net generation includes electric production for use within that province, and may include sales to other provinces and exports to the United States.

TABLE 1.B

INSTALLED CAPACITY AND GENERATION BY PROVINCE AND TERRITORY

PROVINCE/TERRITORY	CAPACITY		ENERGY	
	(%)	(MW)	(%)	(GW.h)
Newfoundland*	7.7	7 352.4	7.8	34 477.1
Prince Edward Island	0.1	122.1	0.0 **	104.4
Nova Scotia	2.2	2 103.7	2.0	8 876.4
New Brunswick	3.5	3 361.2	3.8	16 752.8
Québec	26.8	25 712.1	28.9	128 474.4
Ontario	33.3	31 938.5	30.9	137 535.4
Manitoba	4.2	4 059.4	4.2	18 707.3
Saskatchewan	2.9	2 766.5	3.0	13 131.7
Alberta	7.9	7 554.9	9.0	39 981.4
British Columbia	11.1	10 678.5	10.3	45 569.7
Yukon	0.1	126.3	0.1	440.3
Northwest Territories	0.2	172.2	0.1	443.0
Total	100.0	95 947.8	100.0	444 493.9

* Includes Churchill Falls generating station.

** Less than 0.1 percent

Table 1.C shows the distribution of the total Canadian utility fossil-fuel fired generating capacity and the energy production in 1989. Although, on a national basis, coal-fired generating facilities are the most important sources of fossil-fuel generated electricity in Canada, it should be noted that this is not true in all regions. Many communities in isolated regions rely heavily on fuel oil for their electricity supply. Other regions are heavily reliant on non-fossil fuel sources such as nuclear or hydro. Specific details are provided in Tables 1.4 to 1.6 of the Appendix.

Statistics for multi-fuelled plants are not segregated in the appendix. Those plants are classified by the main fuel used for electricity generation.

TABLE 1.C

CANADIAN UTILITY GENERATION BY TYPE OF FOSSIL- FUELLED GENERATION UNITS

UNIT TYPE		CAPACITY		ENERGY	
		(%)	(MW)	(%)	(GW.h)
Steam:	Oil	21.1	6 273.9	13.1	14 444.1
	Coal	61.4	17 905.6	77.8	85 465.5
	Gas	9.1	2 644.5	7.6	8 366.8
Gas Turbine*		6.3	1 835.3	0.8	868.1
Internal Combustion*		1.8	510.6	0.7	739.0
Total		100.0	29 169.9	100.0	109 883.5

* These unit types may use light fuel oil, diesel fuel or natural gas.

Various types of coal and oil are used for power generation. Table 1.D shows that a significant proportion of the energy generated from coal was produced with imported bituminous coal. Of the total coal used to generate electricity in Canada, Canadian subbituminous coal provided the largest portion of Canadian coal, virtually all of it used in Alberta. However, if imported bituminous coal is included, total bituminous coal provided the largest portion at 46 percent of total coal consumed in Canada. Most of the energy generated from oil was from heavy fuel (residual) oil. Tables 1.7 and 1.8 of the Appendix provide additional information on coal- and oil-fired facilities.

TABLE 1.D

CANADIAN UTILITY GENERATION BY TYPE OF COAL AND OIL

TYPE OF COAL	COAL-FIRED		TYPE OF OIL	OIL-FIRED	
	(%)	(GW.h)		(%)	(GW.h)
Bituminous	17.9	15 274.4	Heavy	93.4	14 281.0
Subbituminous	39.1	33 399.6	Light	1.6	245.4
Lignite	14.6	12 457.2	Diesel	5.0	769.7
Canadian coal subtotal	71.5	61 131.2			
Imported bituminous	28.5	24 334.3			
Total	100.0	85 465.5	Total	100.0	15 296.1

2. UTILITY GENERATION BY PROVINCE AND TERRITORY

Electrical utility generation by primary energy source for each province and territory is summarized below, in Table 2.A. More detailed 1989 data, including utility-reported fuel costs, are shown in Tables 2.1 to 2.12 of the Appendix.

In the provinces of Québec, Manitoba, and British Columbia, and in the Yukon Territory, hydro generation supplied in excess of 90 percent of electricity requirements. While Newfoundland was statistically also in this category, most of the province's hydro electricity was sold to Québec. Excluding Churchill Falls, hydro generation supplied about 70 percent of Newfoundland's electricity requirements. Hydro generation also accounted for a significant portion of the energy supply in Ontario and the Northwest Territories. In Ontario approximately one half of the energy generated was produced in nuclear power plants, whereas in New Brunswick approximately one third of its electricity was produced in its nuclear power plant. Most of the balance of the electricity generated in Canada was produced from fossil fuels.

TABLE 2.A
GENERATION BY PRIMARY ENERGY SOURCE
BY PROVINCE AND TERRITORY
PERCENT OF TOTAL

FUEL TYPE	NFLD	PEI	NS	NB	QUE	ONT	MAN
Coal - Bituminous	—	—	61.9	11.9	—	22.9	—
- Subbituminous	—	—	—	—	—	—	—
- Lignite	—	—	—	—	—	1.7	1.9
Oil - Heavy	5.9	92.5	26.6	42.6	1.1	0.9	—
- Light	0.0 *	0.0 *	0.2	0.1	0.0 *	0.1	0.0 *
- Diesel	0.3	7.5	0.8	0.1	0.2	0.0 *	0.1
Natural gas	—	—	—	—	—	0.0 *	—
Uranium	—	—	—	31.5	3.8	47.5	—
Hydro	93.9	—	10.5	13.9	95.0	26.8	98.0
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (GW.h)	34 477.1	104.4	8 876.4	16 752.8	128 474.4	137 535.4	18 707.3
FUEL TYPE	SASK	ALTA	BC	YUK	NWT	CANADA	
Coal - Bituminous	—	1.4	—	—	—	8.9	
- Subbituminous	0.1	83.5	—	—	—	7.5	
- Lignite	74.6	—	—	—	—	2.8	
Oil - Heavy	—	0.0 *	—	—	—	3.2	
- Light	0.0 *	—	—	—	—	0.1	
- Diesel	0.0 *	0.0 *	0.2	7.9	47.4	0.2	
Natural gas	3.7	11.1	9.2	—	—	2.1	
Uranium	—	—	—	—	—	17.0	
Hydro	21.6	4.0	90.6	92.1	52.6	58.3	
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	
Total (GW.h)	13 131.7	39 981.4	45 569.7	440.3	443.0	444 493.9	

*Less than 0.1 percent.

Note: Totals may not add due to independent rounding.

3. FUEL CONSUMPTION FOR ELECTRICITY GENERATION BY PROVINCE

Fuels used in 1989 for thermal generation by Canadian electric utilities were coal (bituminous, subbituminous and lignite), oil (light, heavy and diesel), natural gas and uranium. Consumption of these fuels is described in the following sections.

3.1 Coal

3.1.1 Bituminous Coal

Of the total 14.7 million tonnes of bituminous coal (average heat content 27 995 kJ/kg) consumed to generate electricity in Canada in 1989 (Table 3.A), 11.2 million tonnes were used in Ontario. Of this, approximately 75 percent was imported from the United States. With the exception of the use of waste metallurgical coal in Alberta, Canadian bituminous coal use was restricted to the provinces of Ontario, Nova Scotia and New Brunswick. The 1989 average cost per tonne of bituminous coal was \$58.53 or 21.7 mills (\$0.0217) per kilowatt hour. The decrease in the average cost per tonne of bituminous coal in 1989 from 1988 was 5.2 percent, and the corresponding cost per kilowatt hour dropped 5.2 percent. Details on provincial consumption and cost are provided in Table 3.1 of the Appendix.

TABLE 3.A

BITUMINOUS COAL CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	MILLIONS OF TONNES
Nova Scotia	14.5	2.141
New Brunswick	5.3	0.778 *
Ontario	76.2	11.220 **
Alberta	3.9	0.577
Total	100.0	14.716

* 0.168 million tonnes (orimulsion coal) were imported into New Brunswick for electricity generation.

** 8.386 million tonnes were imported into Ontario for electricity generation.

3.1.2 Subbituminous Coal

Subbituminous coal (average heat content 18 542 kJ/kg) consumption by electric utilities in 1989 was mainly restricted to Alberta (Table 3.B). Most of Alberta's major generating plants are located close to utility-owned coal mines. As well, the coal is relatively inexpensive to extract. This is why the 1989 average cost of coal to Alberta utilities was only \$8.17 per tonne or 4.87 mills per kilowatt hour. The total Canada average cost per tonne of subbituminous coal and its cost per kilowatt hour both increased in 1989 from 1988 by 9.9 percent and 7.3 percent respectively. Additional details are provided in Table 3.2 of the Appendix.

TABLE 3.B

SUBBITUMINOUS COAL CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	MILLIONS OF TONNES
Saskatchewan	0.1	0.01
Alberta	99.9	19.93
Total	100.0	19.94

3.1.3 Lignite

In 1989, 82 percent of the lignite coal (average heat content 14 708 kJ/kg) used for generation in Canada was consumed in Saskatchewan (Table 3.C). Ontario and Manitoba used a relatively small amount. The 1989 average cost per tonne was \$14.00 or 11.85 mills per kilowatt hour. The decrease in 1989 from 1988 in the average cost per tonne of lignite and cost per kilowatt hour was 9.9 percent and 9.6 percent respectively. Additional details are provided in Table 3.3 of the Appendix.

TABLE 3.C

LIGNITE COAL CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	MILLIONS OF TONNES
Ontario	15.1	1.59
Manitoba	3.1	0.33
Saskatchewan	81.8	8.62
Total	100.0	10.54

3.2 Oil

3.2.1 Light Oil

The consumption of light oil (average heat content 38 560 kJ/L) by Canadian utilities, by province, is shown in Table 3.D. Light oil is primarily used in combustion turbines and as a secondary fuel in coal and heavy fuel oil fired plants. The average cost of light oil in 1989 was \$221.66 per kilolitre or 70.06 mills per kilowatt hour. The high mill rate cost reflects the use of light oil in ignition, warm-up and short duty applications. The average cost per kilolitre of light oil and the cost per kilowatt hour increased in 1989 from 1988 by 11.0 percent and 5.1 percent respectively. Table 3.4 of the Appendix provides additional information on provincial consumption and cost.

TABLE 3.D

LIGHT OIL CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	THOUSANDS OF KILOLITRES
Newfoundland	2.3	1.8
Prince Edward Island	0.0 *	0.0 **
Nova Scotia	7.0	5.4
New Brunswick	5.0	3.9
Québec	21.2	16.4
Ontario	63.6	49.3
Manitoba	0.4	0.3
Saskatchewan	0.5	0.4
Total	100.0	77.5

* Less than 0.1 percent.

** Less than 50 kilolitres.

3.2.2 Heavy Oil

The provincial consumption of heavy fuel oil (average heat content 41 568 kJ/L) by electric utilities in 1989 is shown in Table 3.E. New Brunswick continues to be the largest user of heavy fuel oil for electricity generation, consuming approximately half the total. In 1989, the average cost of heavy fuel oil to utilities was \$109.23 per kilolitre or 28.4 mills per kilowatt hour. The increase in 1989 from 1988 in the average cost per kilolitre of heavy fuel and the cost per kilowatt hour was 13.2 percent and 14.1 percent respectively. More detailed heavy oil consumption data are also presented in Table 3.5 of the Appendix.

TABLE 3.E
HEAVY OIL CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	THOUSANDS OF KILOLITRES
Newfoundland	14.3	531.4
Prince Edward Island	1.0	35.5
Nova Scotia	16.1	597.6
New Brunswick	47.9	1 774.6
Québec	10.9	405.6
Ontario	9.7	360.4
Alberta	0.0 *	0.9
Total	100.0	3 706.0

* Less than 0.1 percent.

3.2.3 Diesel Oil

All the utilities of the provinces and territories reported consumption of diesel oil (average heat content 37 698 kJ/L) in 1989 (Table 3.F). Diesel is mainly used to fuel internal combustion generating plants in isolated regions. The largest consumers were therefore provinces with a substantial number of isolated communities: Newfoundland, Québec, British Columbia, Yukon and the Northwest Territories. These accounted for approximately 82 percent of the total consumption. The average cost to utilities for diesel fuel in 1989 was \$219.53 per kilolitre or 69.26 mills per kilowatt hour. The decrease in 1989 from 1988 in the average cost per kilolitre of diesel oil was 28.5 percent. The cost per kilowatt hour decreased in 1989 from 1988 by 37.2 percent. Additional details are presented in Table 3.6 in the Appendix.

TABLE 3.F

DIESEL OIL CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	THOUSANDS OF KILOLITRES
Newfoundland	12.3	29.9
Prince Edward Island	1.3	3.2
Nova Scotia	9.7	23.6
New Brunswick	1.7	4.2
Québec	27.3	66.2
Ontario	0.1	0.2
Manitoba	2.8	6.8
Saskatchewan	0.4	0.9
Alberta	2.0	4.9
British Columbia	11.1	26.9
Yukon	4.0	9.7
Northwest Territories	27.3	66.3
Total	100.0	242.8

3.3 Natural Gas

Table 3.G below shows the percentage distribution of natural gas (average heat content 38 003 kJ/m³) consumption by province. In 1989 Alberta accounted for approximately 51 percent of the total, and British Columbia 42 percent of the total. The 1989 average cost of natural gas to utilities was \$61.77 per thousand cubic metres, or 18.6 mills per kilowatt hour. The decrease in 1989 from 1988 in the average cost of natural gas and the cost per kilowatt hour was 20.7 percent and 30.1 percent respectively. Details are provided in Table 3.7 of the Appendix.

TABLE 3.G

NATURAL GAS CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	MILLIONS OF CUBIC METRES
Ontario	0.1	1.4
Manitoba	0.0 *	0.6
Saskatchewan	6.8	187.2
Alberta	51.0	1 399.0
British Columbia	42.1	1 156.1
Total	100.0	2 744.3

* Less than 0.1 percent.

3.4 Uranium

Table 3.H summarizes the use, by province, of uranium (average heat content 695 146 kJ/g) for the generation of electricity in 1989. In Canada, only three provinces, Ontario, New Brunswick and Québec have nuclear power reactors for generating electricity. In 1989, the average cost of uranium fuel in Canada was \$282.28 per kilogram of uranium, or 4.95 mills per kilowatt hour. The average cost of uranium increased in 1989 from 1988 by 1.1 percent. The cost per kilowatt hour increased 2.1 percent in 1989 from 1988. Additional details are provided in Table 3.8 of the Appendix.

TABLE 3.H
URANIUM CONSUMPTION FOR ELECTRICITY GENERATION

PROVINCE	% OF TOTAL	THOUSANDS OF KILOGRAMS
New Brunswick	8.0	105.8
Québec	6.7	89.2
Ontario	85.2	1 126.9
Total	100.0	1 321.9

3.5 Comparative Fuel Cost of Electricity Generation

Table 3.I summarizes the fuel costs of electricity generation by types of fuel used to generate electricity in Canada in mills/kW.h with the primary users of those fuels. Although subbituminous coal had the lowest cost advantage in Canada in 1989, this is primarily due to the inexpensive extraction of this resource and the vertical integration of coal mining and power industries in Alberta. Because of this, the average cost spread of electricity generation between subbituminous coal and uranium has narrowed considerably in 1989. Light oil and diesel (both similar fuels at about 70.0 mills/kW.h) were the highest cost source of fuel for electricity generation in 1989. More details are provided in Tables 3.1 to 3.8 in the Appendix.

TABLE 3.I
COMPARATIVE FUEL COST OF ELECTRICITY GENERATION

TYPE OF FUEL	Mills/kW.h*	PRIMARY USERS IN CANADA
Bituminous coal	21.7	Ontario, Nova Scotia
Subbituminous coal	4.9	Alberta
Lignite	11.9	Saskatchewan
Light oil	70.1	Ontario
Heavy oil	28.4	New Brunswick
Diesel	69.3	Québec, Northwest Territories
Natural gas	18.6	Alberta, British Columbia
Uranium	5.0	Ontario

* Average total cost in Canada.

3.6 Comparison of Electricity Supply Costs by Province

Table 3.J shows the total cost of electricity supply subdivided by fixed and fuel cost components by the electric utilities in each province in Canada. The total cost of electricity supply is equal to the fuel cost of generation plus fixed costs of electricity supply based on an assumed annual fixed charge of 11.0 percent for all generating, transmission and distribution plants as well as other property and equipment and construction in progress (less depreciation), plus the cost of purchases minus revenue from sales in that year.

In 1989, the total system cost of electricity supply by the electric utilities in Canada ranged from 20.69 mills/kW.h in the predominantly hydro system of British Columbia to 79.52 mills/kW.h in the mixed hydro/diesel electricity generation system of the Northwest Territories.

The ranking of electricity supply costs for 1989 by type of generation for each province is as follows:

- In the hydro based systems of Québec, Manitoba, British Columbia, and the Yukon, the total costs of electricity supply ranged from 20.69 mills/kW.h in British Columbia to 35.41 mills/kW.h in the Yukon.
- In the lignite and subbituminous coal based electricity generating systems of Saskatchewan and Alberta, the total costs of electricity supply were 24.85 mills/kW.h and 25.76 mills/kW.h respectively.
- In the mixed hydro/thermal electricity generating systems of Newfoundland (excluding Churchill Falls), Nova Scotia, New Brunswick, Ontario and the Northwest Territories, the system cost of electricity supply ranged from 23.43 mills/kW.h in Newfoundland to 79.52 mills/kW.h in the Northwest Territories.
- The oil based electricity generating system of Prince Edward Island had a total system cost of electricity supply of 56.97 mills.kW.h.

TABLE 3.J
COMPARISON OF ELECTRICITY SUPPLY
COSTS BY PROVINCE

1989

(Mills/kW.h)

PROVINCE/ TERRITORIES	AVERAGE SYSTEM FUEL COST	TOTAL SYSTEM COST OF ELECTRICITY SUPPLY(1)
Newfoundland(2)	8.40	23.43
Prince Edward Island	48.62	56.97
Nova Scotia	24.45	42.92
New Brunswick	14.76	23.95
Québec	0.53	23.14
Ontario	8.23	36.20
Manitoba	0.50	23.71
Saskatchewan	7.80	24.85
Alberta	6.29	25.76
British Columbia	1.64	20.69
Yukon	6.14	35.41
Northwest Territories	45.71	79.52
Canada	4.93	28.06

Notes:

(1) Includes net fixed assets plus fuel cost of generation plus the cost of purchases minus revenue from sales to meet utility domestic demand in 1989. Total fixed assets are based on 11.0 percent annual fixed charge.

(2) Excluding Churchill Falls.

Source: Statistics Canada - Electric Power Statistics - Volume II Annual Statistics, 1989 (See bibliography)

4. ACTUAL NET STATION HEAT RATES

The efficiency of thermal generating stations can be expressed in terms of their respective heat rates in kJ/kW.h. In this report, net station heat rates are obtained by dividing the gross kilojoule energy input to a station by its net electrical energy generation (net station generation is equal to the gross station generation less the station service load). For presentation purposes, the actual net station heat rates are plotted against unit size based on the nameplate rating of the largest unit in the respective plant. These unit size heat rates are represented by the curves presented in Figure 4.A, 4.B, and 4.C for the various types of generating stations. Over the period 1979 to 1989, the curves represented in these figures have not changed to any notable degree. The data used reflect actual net station heat rates obtained under actual operating conditions and are not to be confused with design heat rate curves for various types and sizes of thermal units. Because of insufficient data, no curves are shown for nuclear- or gas-fired generating stations.

4.1 Steam Electric Plants

Figure 4.A shows the 1989 net station heat rates associated with coal- and oil-fired steam electric generating stations in Canada. Coal-fired units ranged in size between 15 and 512 MW; oil-fired units ranged between 20 and 550 MW.

4.2 Gas Turbines

Net heat rates for gas turbines versus unit size are illustrated in Figure 4.B. Because gas turbines of similar sizes may have widely varying heat rates (depending on the mode of operation of the units and the ambient air temperature), a single-valued function is not appropriate. Therefore, a range is shown for each unit size. The majority of data points fell between or on the upper and lower curves. As Figure 4.B shows, the variation in unit size is from 7 to 68 MW. Gas turbines ranged in size between 2.5 and 68 MW.

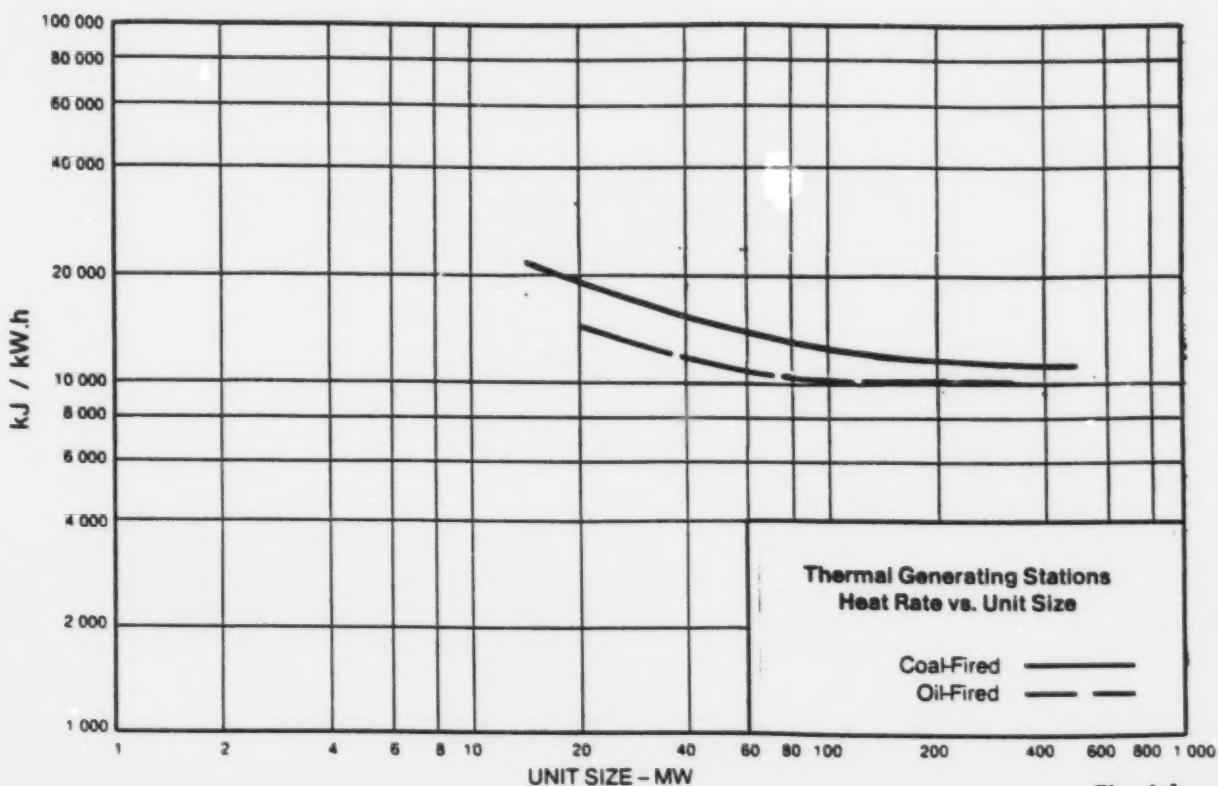


Fig. 4.A

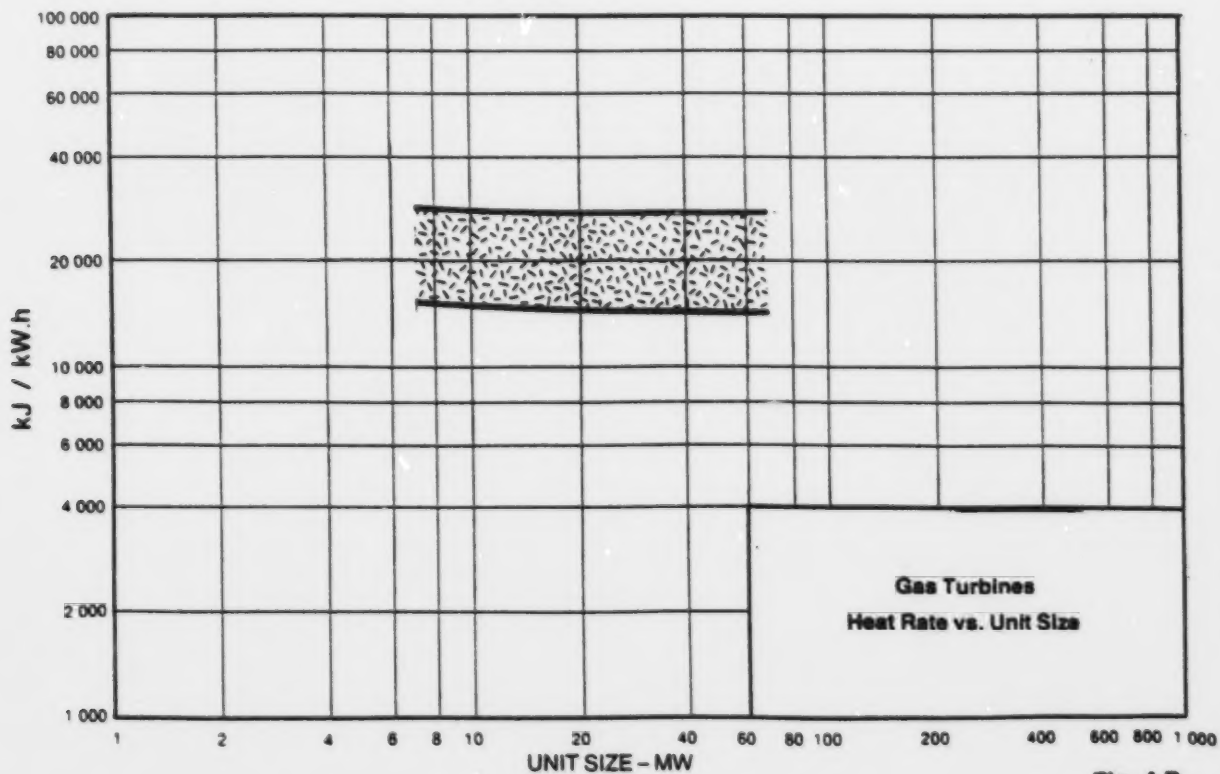


Fig. 4.B

4.3 Internal Combustion Units

Analysis of data for internal combustion units of similar sizes shows a variation of heat rates. The lower heat rates reflect units used more or less continuously while the higher values are representative of units used principally for standby operation. Internal combustion unit size versus heat rate relationships can be more appropriately expressed by a curve having an upper and lower bound rather than by a single line. The curve is displayed in Figure 4.C where most of the data points fell between or on the upper and lower curves. The figure is based on unit sizes ranging from 10 to 6 800 kW. For units larger than 2 000 kW, heat rates range from 10 000 kJ/kW.h to 20 000 kJ/kW.h.

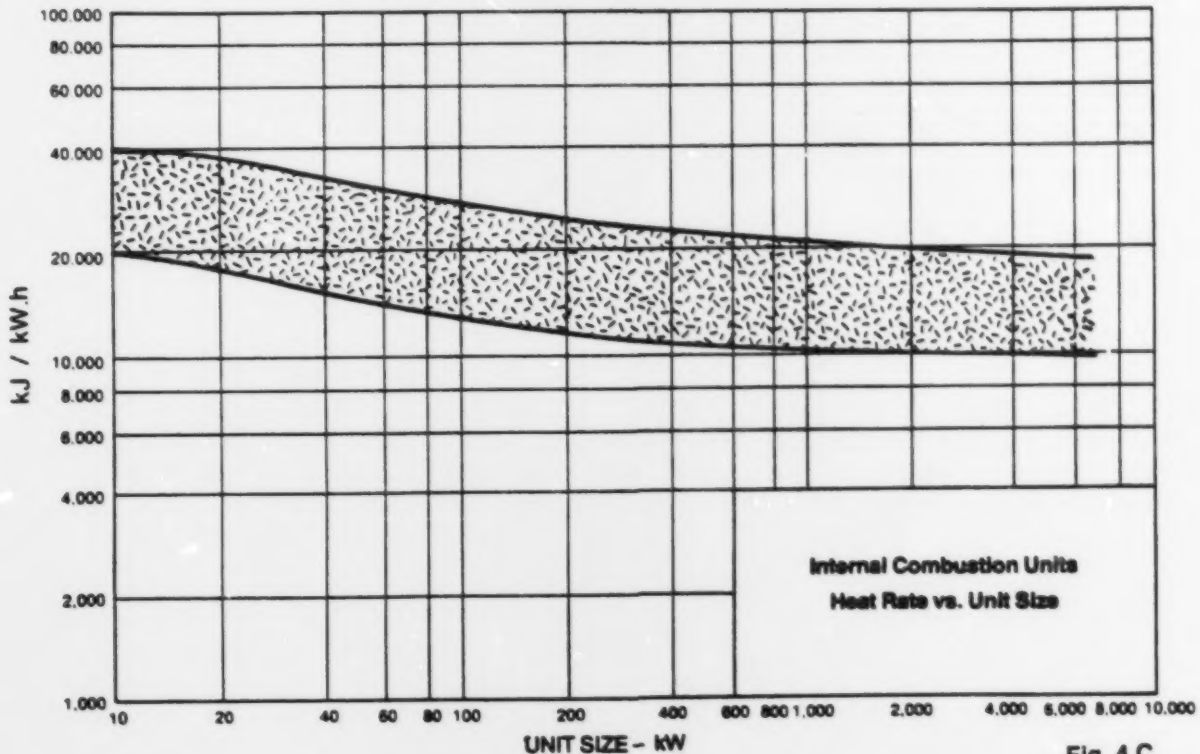


Fig. 4.C

5. CANADIAN AND PROVINCIAL TREND ANALYSIS 1985-1989

The previous sections deal with generation, fuel consumption and cost data for Canadian electrical utilities in the year 1989. This section reviews Canadian and provincial trends (including the Yukon and Northwest Territories) over the historical period 1985 to 1989. The data are based on previous reports in this series except for the data on industrial self-generation and total provincial consumption, which are based on Statistics Canada publications. The provincial consumption includes the total provincial generation, plus purchases, minus exports and inter-provincial sales. The difference between consumption and total generation is shown as a net inflow or net outflow.

5.1 Canada

Figure 5.1(a), shows the total energy generation and consumption figures for Canada during the period 1985 to 1989 inclusive. Total generation increased at a compound annual rate of 2.0 percent from 1985 to 1989. Total generation decreased 1.4 percent in 1989 from 1988. Total consumption increased 3.9 percent per annum in the five years leading up to 1989 and increased 2.5 percent in 1989. In 1989, gross exports of electricity to the United States were 22 TWh, down 35 percent from the level in 1988. This decrease in export sales was attributable to a combination of low water conditions in Canada and increased demand in some provinces.⁽¹⁾

Figure 5.1(b) illustrates the share of total generation by primary energy source. The hydro share of total generation, due to low water levels, decreased in 1989 to 58 percent of total generation; a decrease of 4.3 percent from 1988. The nuclear generation share of the total remained essentially unchanged from the previous year at 17 percent. The coal component of the total share increased by 1.6 percent to 19.2 percent of the total. Although the use of oil and gas continue to be insignificant, its share almost doubled to 5.5 percent of the total as a result of increased demand in Alberta and British Columbia. Also, a large portion of this gas generation was also attributable to British Columbia exporting natural gas-fired electricity production from its own natural gas-fired units as well as natural gas-fired production purchased from Alberta for sales to the California market. British Columbia had a low water year in 1989.

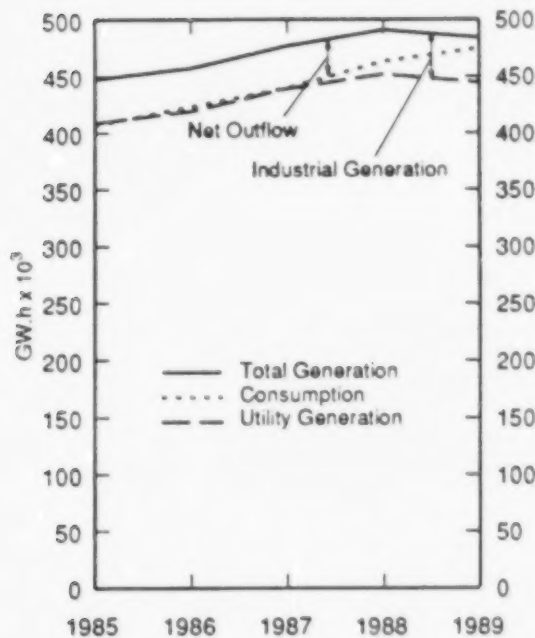
Figure 5.1(c) shows thermal energy generated by fuel type while Figure 5.1(d) shows the corresponding fuel cost (mills/kWh) associated with each type over the review period. Also shown in Figure 5.1(d) is the average system fuel cost trend for Canada. The average system fuel cost was calculated by dividing the total electrical utilities' fuel costs for each year by the total generation including both thermal and hydro production. The average system fuel cost for each province is shown in the graphs in section 5.2 to 5.13 which follow. This trend gives an indication of the significance of the fuel cost component to the total system generation costs. From Figure 5.1(d) it can be seen that the average system fuel cost, which was 4.55 mills/kWh during 1984, has increased to 4.93 mills/kWh in 1989. The increase from 1988 to 1989 was 9.6 percent and reflects to a significant extent the consequences of reduced hydro production.

(1) In 1989, the exporting provinces of British Columbia, Manitoba, Québec and Ontario continued to have dry conditions which have persisted since 1987 (although Manitoba showed some hydro recovery in 1989). Therefore, Canadian utilities had very little surplus energy available for export, resulting in tight operating systems. (Includes low water conditions at Churchill Falls in Newfoundland).

Fig. 5.1 Canada

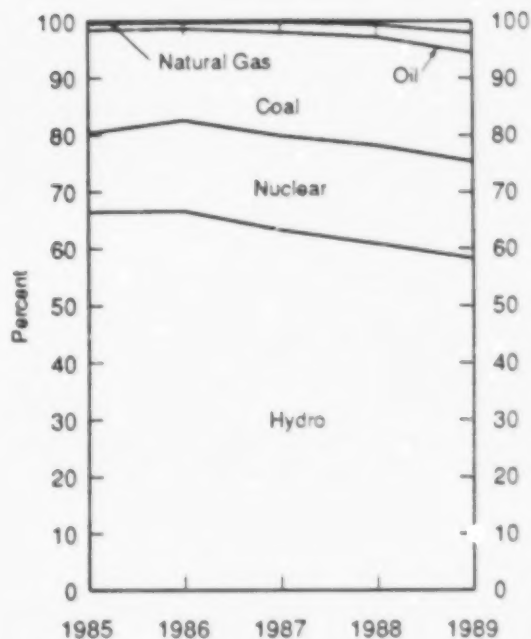
Net Generation and Consumption

(a)



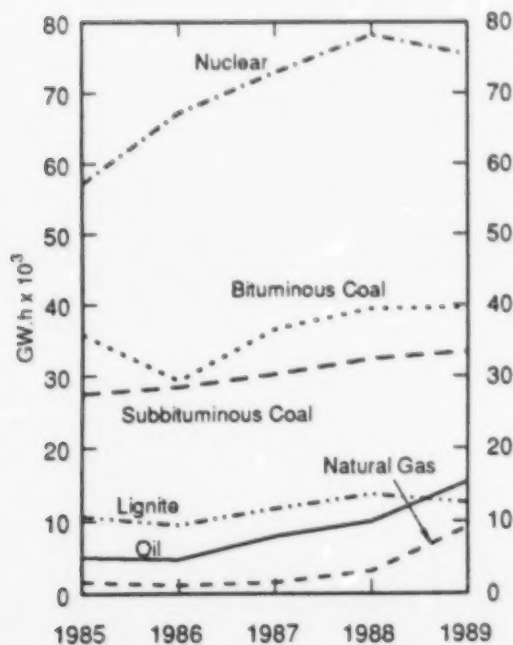
Percent of Total
Utility Net Generation

(b)



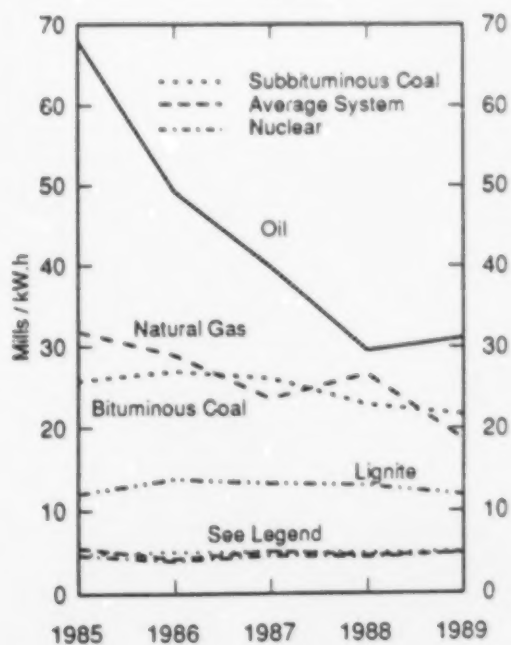
Utility Net Thermal Generation
by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



It must be noted that the average system fuel cost for electric utilities in Canada includes a significant component of low cost nuclear generation priced at 4.95 mills/kW.h in 1989 and hydro generation which is assumed to be of zero fuel cost. Nuclear and hydro generation by electric utilities comprised approximately 75 percent of the total. The zero cost assumption for hydro does not take into account water usage charges or taxes which are levied in certain provinces.

5.2 Newfoundland

As shown in Figure 5.2(a), electric utilities' net generation for 1989 in Newfoundland, was 34 477 GW.h, a decrease of 15.4 percent from 1988. This decrease is attributable to a decrease in the amount of hydro energy generated from the Churchill Falls plant and other hydro plants in Newfoundland. The energy generated from Churchill Falls is shown as a net outflow in Figure 5.2 (a). Consumption within the province has increased steadily since 1985. The increase from 1985 to 1989 was 2.3 percent. The increase in 1989 from 1988 was 4.7 percent.

Excluding Labrador, hydro-electric generation accounted for 70 percent of Newfoundland's total electricity supply in 1989. The balance was supplied from oil-fired facilities. Newfoundland continues to rely on oil-fired generation to make up the difference between total provincial demand and the variable supply available from hydro generation on the island. This variability, due to the limited hydro storage capacity available and annual changes in rainfall, explains the fluctuations in oil consumption illustrated in Figure 5.2(c).

Excluding the Churchill Falls generation in Labrador, the average system fuel cost decreased to 8.4 mills/kW.h in 1989 from 16.1 mills/kW.h in 1988. This was due to the continued low price of oil. The average system cost (excluding Churchill Falls) over the five year period to 1989 has varied, depending on hydro availability and the burning of oil to generate electricity.

5.3 Prince Edward Island

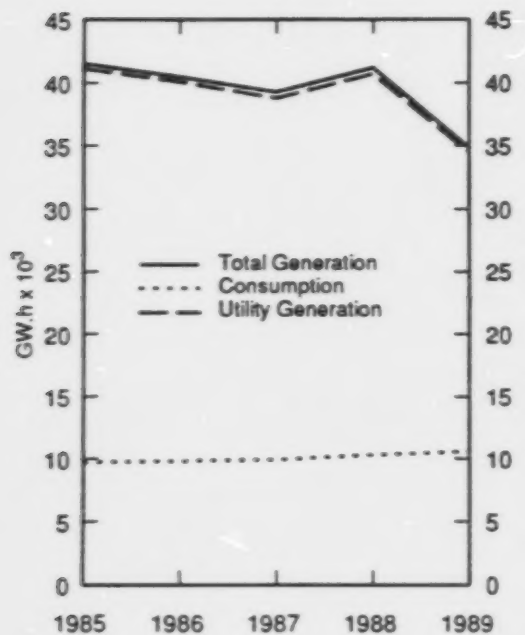
All of Prince Edward Island's on-island generation is oil-fired as illustrated in Figure 5.3(b). The province's major utility, Maritime Electric, purchased a capacity participation in the N.B. Power Corporation's [NBPC] Dalhousie # 2 coal-fired unit, and the island's consumption is now almost totally supplied by this arrangement and by purchases of energy from NBPC, over an underwater cable interconnection. The Interconnection Agreement (signed in 1981) is for 30 years.

In 1989, the island's electricity consumption was 727 GW.h, a 5.2 percent increase from the previous year. Of this, 104 GW.h was generated on the island. In 1988, the on-island generation was 85 GW.h. However, the higher on-island demand in 1989 combined with reduced availability of electricity from New Brunswick and flow-through availability from Québec, has led to an increase in the on-island generation. The average system cost for on-island generation in 1989 was 48.6 mills/kW.h, a decrease of 16.2 percent from the previous year. The average system plotted line in Figure 5.3 (d) is oil, the only fuel used by the island utility.

Fig. 5.2 Newfoundland

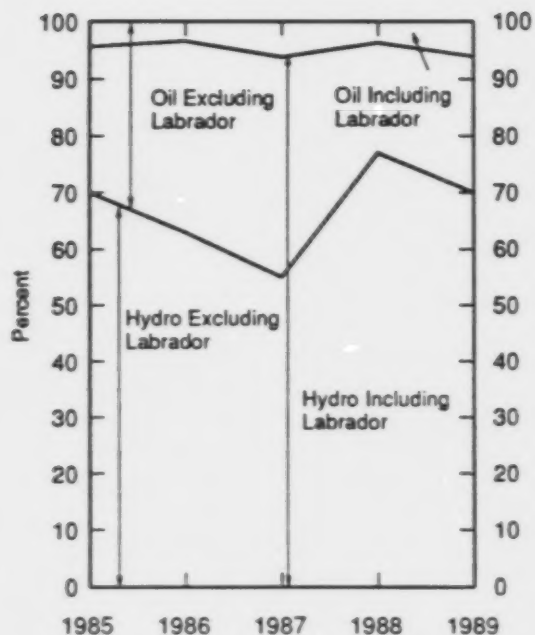
Net Generation and Consumption

(a)



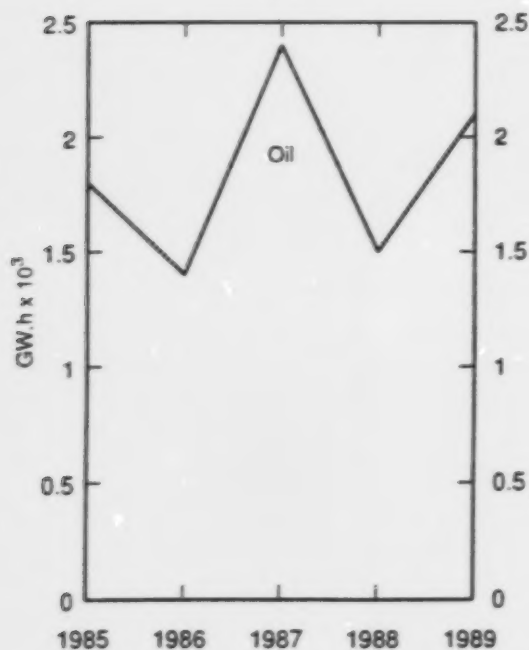
Percent of Total Utility Net Generation

(b)



Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)

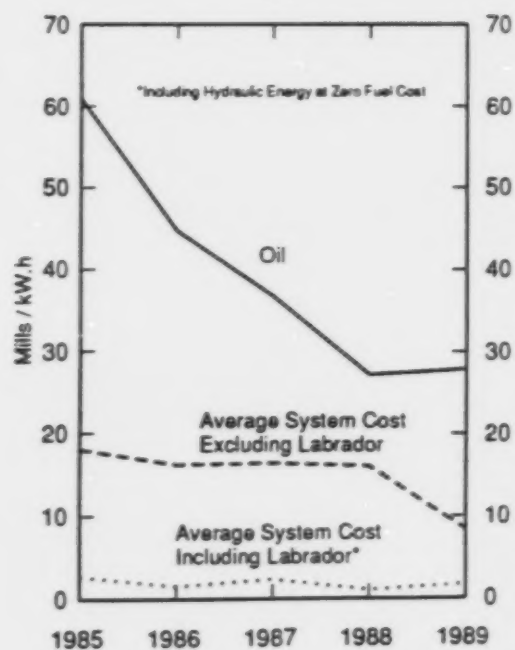
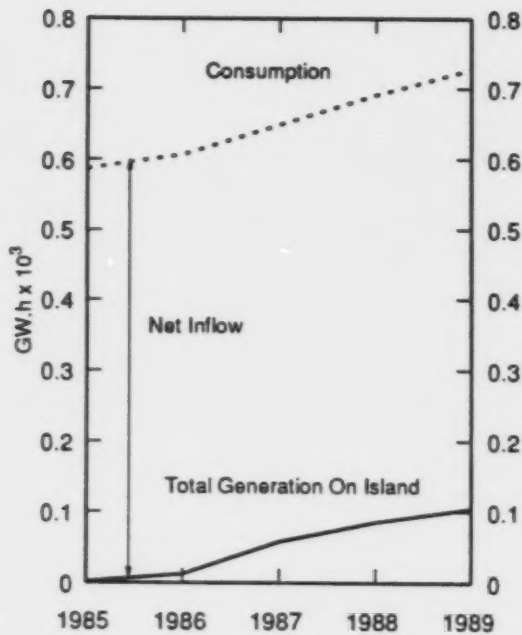


Fig. 5.3 Prince Edward Island

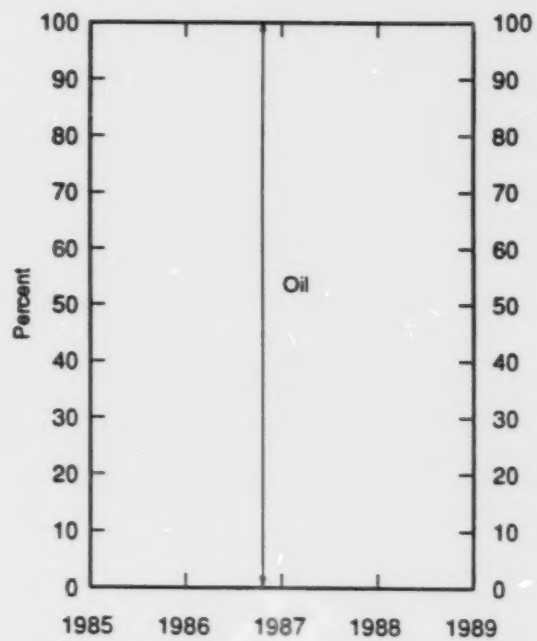
Net Generation and Consumption

(a)



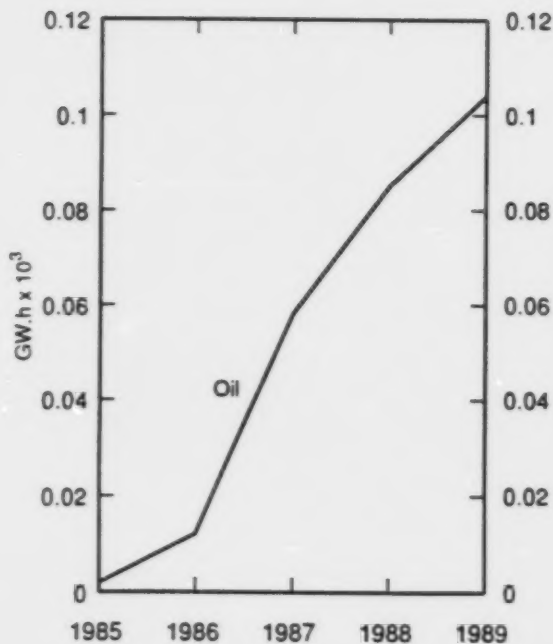
Percent of Total Utility Net Generation

(b)



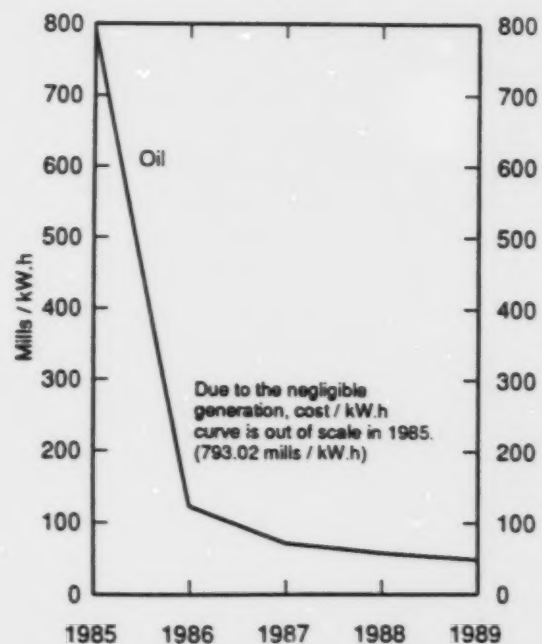
Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



5.4 Nova Scotia

As shown in Figure 5.4(a), net utility generation increased to 8 876 GW.h in 1989 from 8 512 GW.h in 1988, an increase of 4.3 percent. Nova Scotia purchased from New Brunswick to make up the difference to meet total consumption. Figures 5.4(b) and 5.4(c) show that the province continues its use of indigenous coal resources to reduce its dependence on oil-fired generation. In 1989, 62 percent of total generation was produced using coal. However, as illustrated in Figure 5.4(b), Nova Scotia has been increasing the share of oil as a fuel to meet demand. This was mainly due to labour strikes in the coal mining industry and oil prices being very competitive to coal allowing the Nova Scotia utility to protect its coal stock piles. Hydro production of electricity decreased to 10.5 percent in 1989 from 12.6 percent of the total share in 1988.

Total consumption increased from 7 626 GW.h in 1985 to 9 273 GW.h in 1989, an average annual rate of increase of 5.0 percent. The 1989 increase over 1988 was 4.4 percent.

The average system fuel cost remained relatively stable decreasing from 24.6 mills/kW.h in 1988 to 24.5 mills/kW.h in 1989. This decrease in the average system fuel cost is mainly attributable to the decrease in the world oil price.

5.5 New Brunswick

As shown in Figure 5.5(a), net utility generation increased to 16 753 GW.h in 1989 from 15 192 GW.h in 1988, an increase of 10.3 percent. Net utility generation increased 11.7 percent per annum in the five years leading to 1989. In-province consumption increased 5.9 percent in 1989 to 13 450 GW.h. Since 1985, consumption increased at an annual rate of 6.4 percent. The balance of in-province consumption, illustrated in Figure 5.5(a), was met by purchases from Hydro-Québec.

Figure 5.5(b) shows that in 1989, approximately 43 percent of total utility net generation was oil-fired, and 12 percent was coal-fired. This increase is attributable to the reduced availability of hydro and nuclear resources in 1989. Over half of total in-province generation in 1989 was from oil and coal followed by nuclear generation at 32 percent. A combination of a cold winter, increased demand, and a tight system (considerably less energy purchases from Québec) with favourable oil prices resulted in increased consumption of oil to generate electricity in 1988 and 1989.

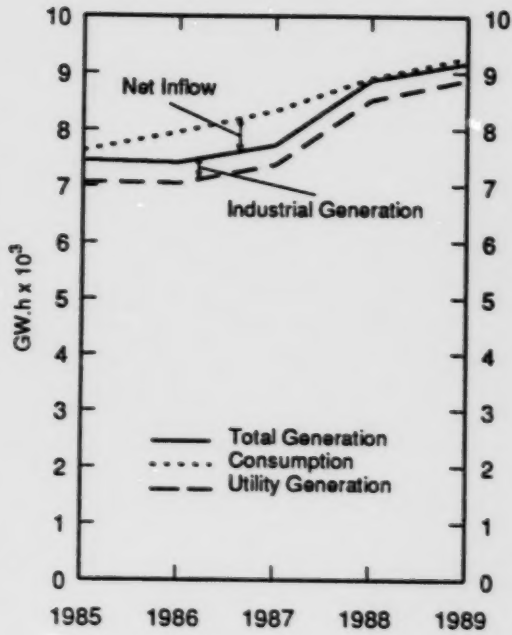
Export sales in 1989 decreased to 4 640 GW.h from 5 191 GW.h in 1988. Purchases from Hydro-Québec were 1 967 GW.h in 1989, down from 3 132 GW.h in 1988. Interprovincial sales totalled approximately 3 136 GW.h in 1989. This is shown as a net outflow in Figure 5.5(a).

Although New Brunswick increased its consumption of oil dramatically since 1986 to offset the decreased availability of purchases of energy from Hydro-Québec, the decreased price of oil more than compensated for this in New Brunswick's average system fuel cost. The average system fuel cost in 1989 was 14.8 mills/kW.h, up from the previous year of 12.0 mills/kW.h, however, down from 15.6 mills/kW.h in 1985.

Fig. 5.4 Nova Scotia

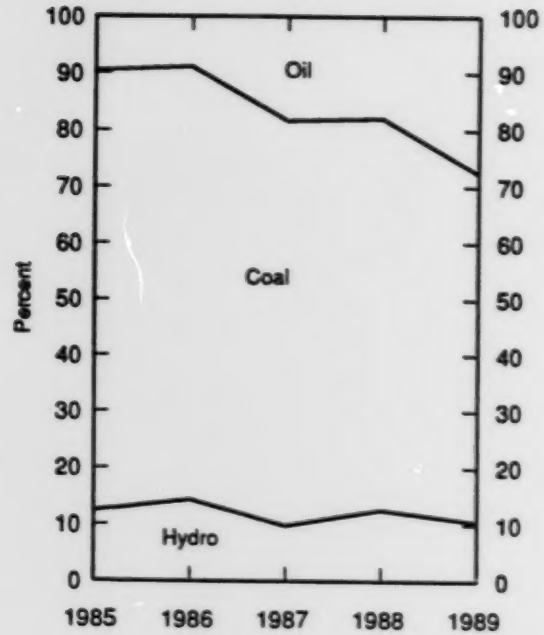
Net Generation and Consumption

(a)



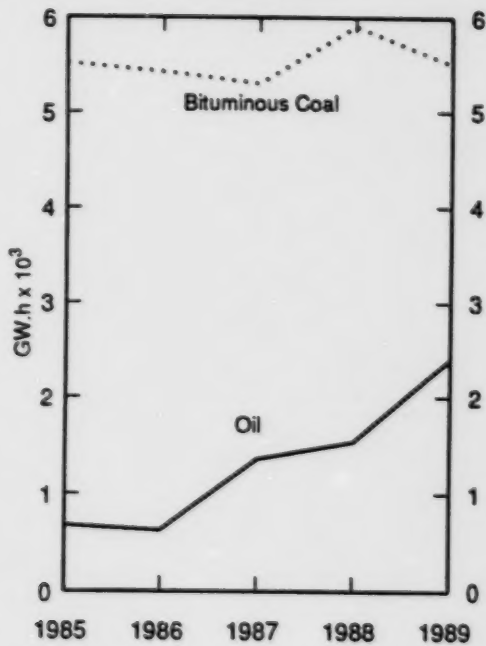
Percent of Total
Utility Net Generation

(b)



Utility Net Thermal Generation
by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)

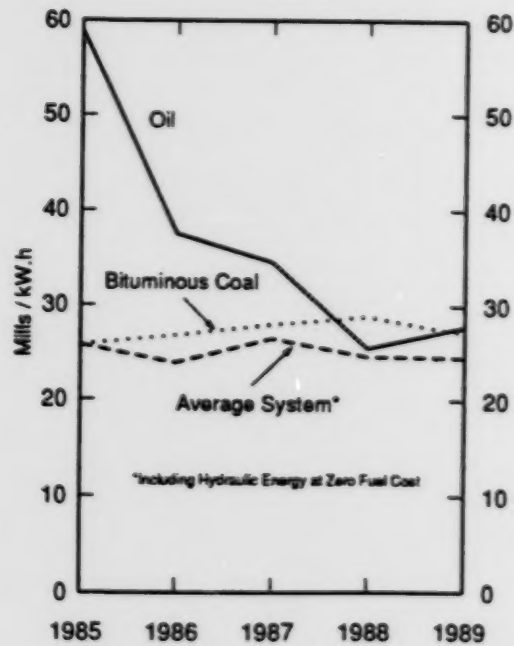
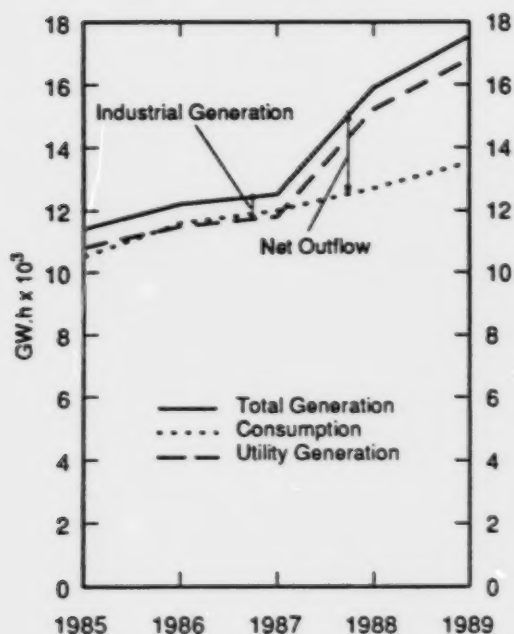


Fig. 5.5 New Brunswick

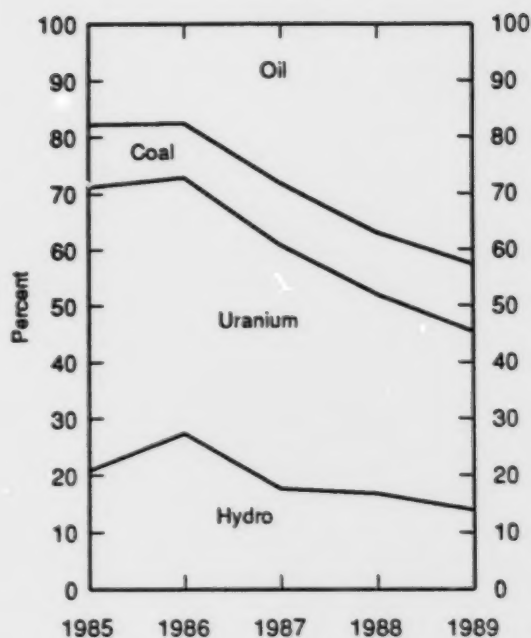
Net Generation and Consumption

(a)



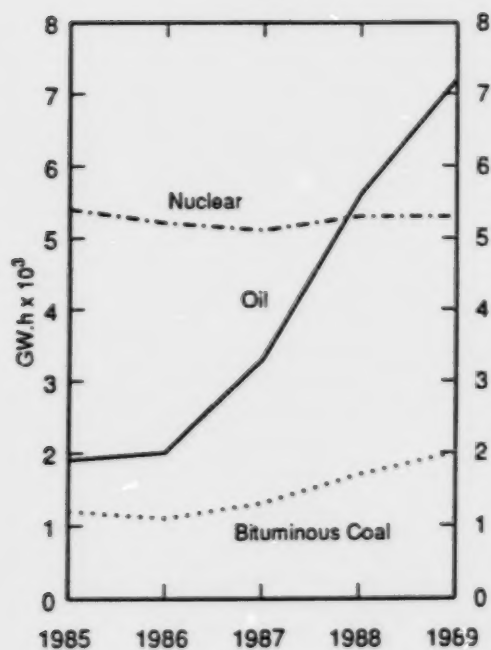
Percent of Total Utility Net Generation

(b)



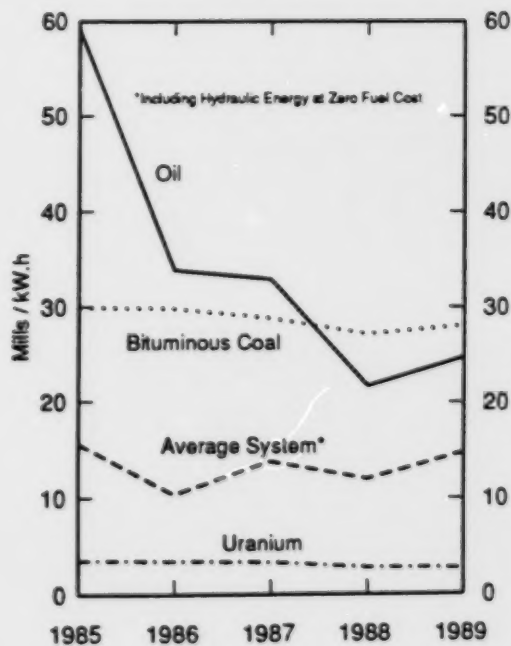
Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



5.6 Québec

As shown in Figure 5.6(a), net electric utility generation in Québec decreased by 3.0 percent in 1989 to 128 474 from 132 495 GW.h in 1988. Figures 5.6(b) and 5.6(c) illustrate that virtually all of the energy generated in the province is hydro-based. Oil is used primarily in peaking facilities and in isolated locations. Nuclear generation is also shown for the Gentilly II reactor, Québec's only operating nuclear power facility.

In 1989, in-province consumption decreased to 163 524 GW.h from 164 006 GW.h in 1988, a decrease of 0.3 percent. The average annual rate of growth in consumption since 1985 is 3.1 percent.

Figure 5.6(a) also shows a net inflow of electricity from outside the province. This is due to Hydro-Québec's purchase of 24 343 GW.h in 1989 from Churchill Falls in Labrador and approximately 1 000 GW.h from other neighbouring systems. Québec exported 5 627 GW.h of energy to the United States in 1989 compared with 11 863 GW.h in 1988, a reduction of 53 percent. Québec sold a total of 4 100 GW.h to Ontario and New Brunswick in 1989, a decrease of 22 percent from the previous year. Continuing dry weather conditions in 1989 in Québec resulted in Hydro-Québec decreasing its exports and interprovincial sales and increasing purchases from neighbouring utilities to meet its domestic load. Québec also imported 1 187 GW.h of electricity from the United States in 1989.

The average system fuel cost of electricity generation, assuming a zero cost for hydro, was negligible.

5.7 Ontario

Figure 5.7(a) illustrates that in 1989, net utility generation decreased to 137 535 GW.h from 138 951 GW.h in 1988, a decrease of 1.0 percent. Figure 5.7(b) shows that in 1989, the nuclear share of total electrical energy generation remained at approximately 50 percent, the largest single source of generation. In the period 1985 to 1989, nuclear production increased from 48 TW.h to 65 TW.h, an increase of 35.4 percent which is indicative of Ontario's continued reliance on nuclear energy. The coal-fired generation share also remained at 25 percent of the total compared with the previous year. Most of the economic hydro resources in Ontario have been developed. As a result, most major new facilities are either nuclear- or coal-fired.

In 1989, total consumption of electricity in Ontario increased to 147 492 GW.h from 140 948 GW.h in 1988, an increase of 4.6 percent. Total consumption increased at an annual rate of 4.8 percent per annum in the five year period to 1989.

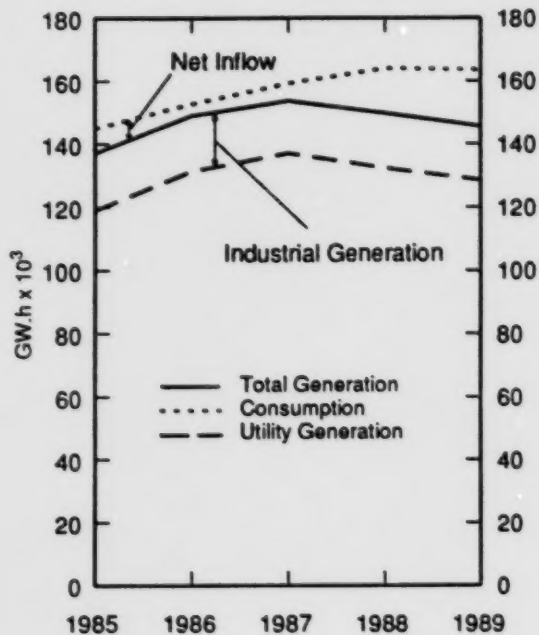
In 1989, gross exports from Ontario were 4 356 GW.h, down from 7 438 GW.h in 1988, a decrease of 41 percent. Interprovincial purchases from Québec and Manitoba totalled approximately 2 400 GW.h. Ontario imported 7 819 GW.h from the United States, up from 2 491 GW.h in 1988, representing a dramatic increase of over 200 percent. In 1989, Ontario experienced a tight operating system and low hydro conditions coupled with rising in-province demand. Furthermore, the strict provincial acid gas emission criteria limited Ontario Hydro's generation from coal. This resulted in the purchasing of large amounts of energy from neighbouring provinces and the United States.

The average system fuel cost in 1989 was 8.2 mills/kW.h, the same as the previous year but down from 8.7 mills/kW.h in 1985. A significant contributor to this low cost was the nuclear fuel component at a cost of 5.3 mills/kW.h in 1989.

Fig. 5.6 Québec

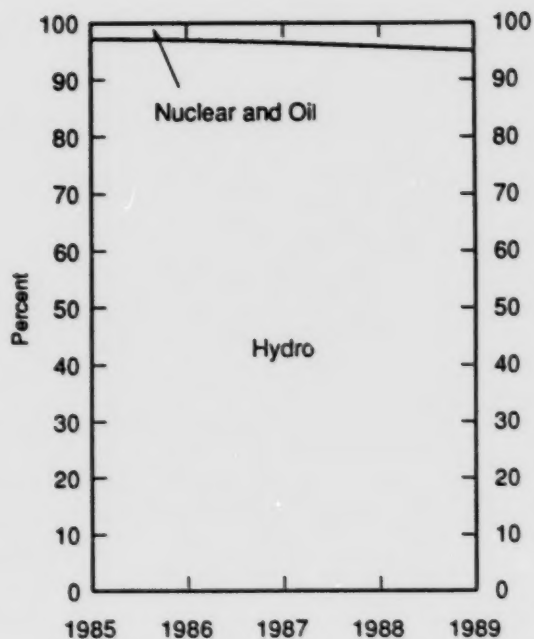
Net Generation and Consumption

(a)



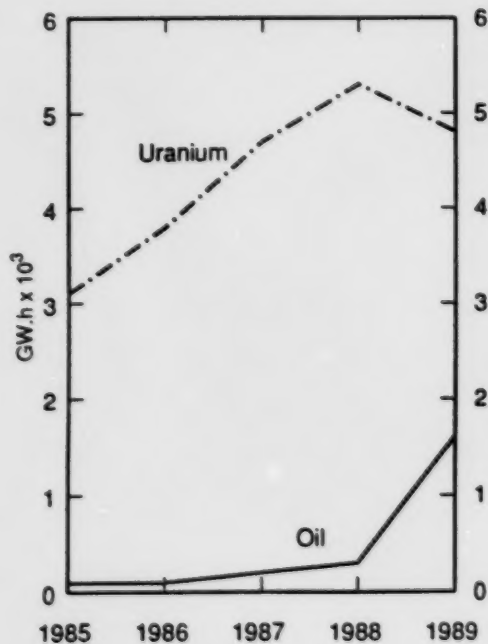
Percent of Total Utility Net Generation

(b)



Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)

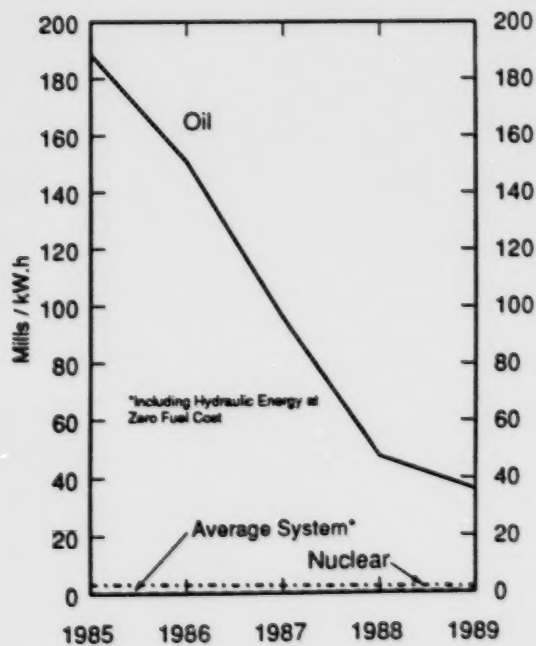
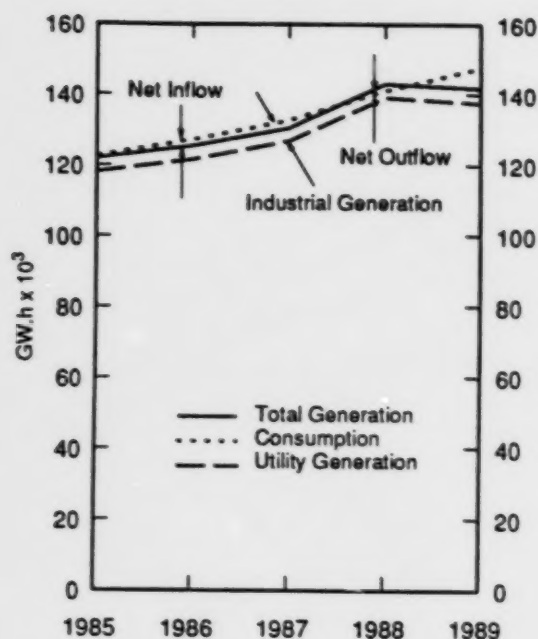


Fig. 5.7 Ontario

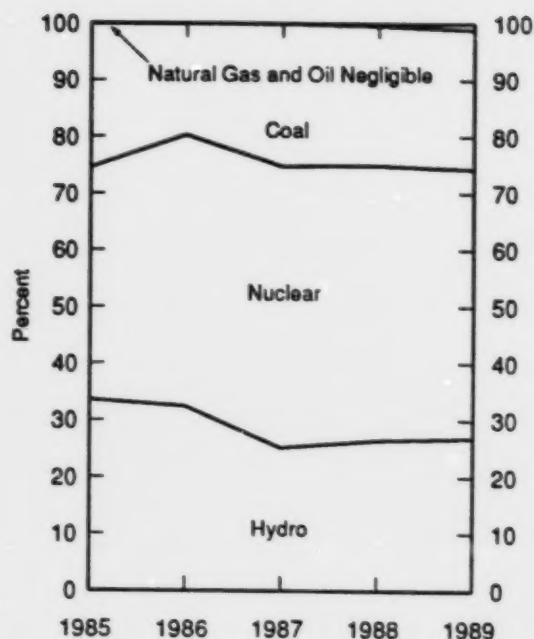
Net Generation and Consumption

(a)



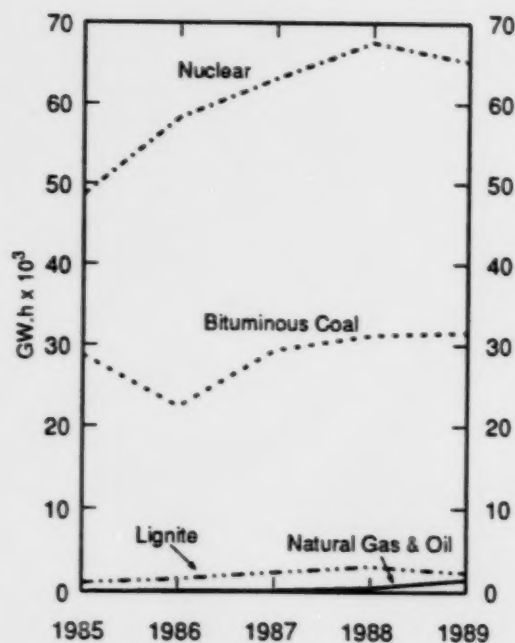
Percent of Total Utility Net Generation

(b)



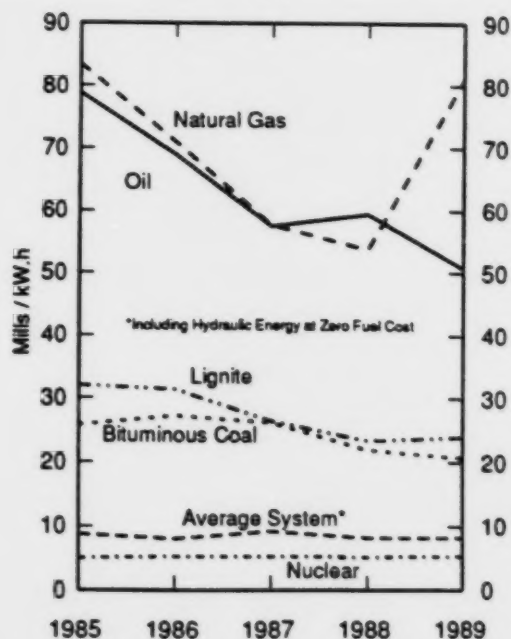
Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



5.8 Manitoba

Figure 5.8(a) shows that net utility generation in Manitoba was 18 707 GW.h in 1989, up from 16 260 GW.h in 1988 for an annual increase of 3.6 percent. Although this was indicative of a significant recovery from the drought which affected the province in 1988, it was still below the net generation in 1987 of 19 850 GW.h. Virtually all of the energy was produced from hydro resources. Figure 5.8(b) shows that fossil fuel use decreased to approximately two percent of total generation.

Total in-province consumption increased to 17 637 GW.h in 1989 from 16 870 in 1988, an increase of 4.6 percent. Export sales increased to 1 288 GW.h in 1989 from 629 GW.h in 1988, however, still down from 3 461 GW.h in 1987.

The average system fuel cost was insignificant since hydro is included at zero cost and fossil fuels were hardly used.

5.9 Saskatchewan

As shown in Figure 5.9(a), utility net generation increased to 13 132 GW.h in 1989 from 12 617 GW.h in 1988. Water flows increased on the Saskatchewan River system in 1989, providing an increase in hydro availability. In 1989, hydroelectric production increased 16 percent over 1988. Coal continues to be the major source of electricity in Saskatchewan, accounting for approximately 75 percent of the total in 1989, as shown in Figure 5.9(b). Lignite coal provided virtually all of the total coal produced electricity in 1989. Gross exports totalled 74.9 GW.h in 1989, but were offset by energy purchases from Manitoba and some imports, resulting in a net inflow.

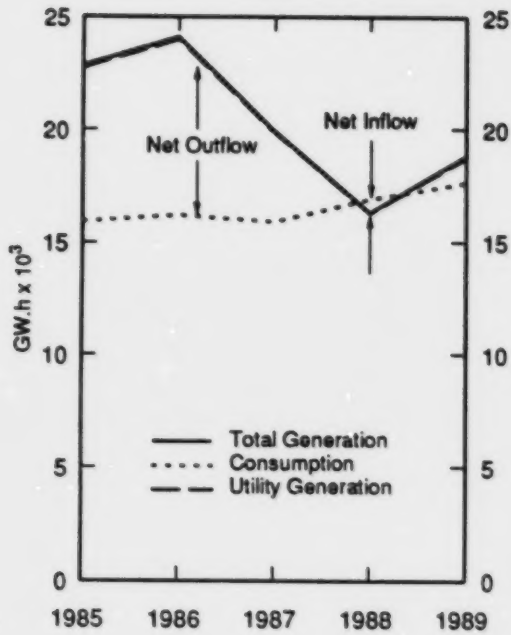
In-province consumption increased to 13 625 GW.h in 1989 from 13 472 GW.h in 1988, an increase of 1.1 percent. The five-year annually compounded growth rate to 1989 was 3.1 percent.

In 1989, the average system fuel cost was 7.8 mills/kW.h, down from 8.4 mills/kW.h in 1988. This low average cost was due to the heavy reliance on inexpensive sources of indigenous lignite. However, the decrease in 1989 from the previous year was due to the increase in the share of total generation made up by hydroelectric production. Oil was also used for electricity generation, but the amount used was insignificant and is not shown in Figure 5.4(d).

Fig. 5.8 Manitoba

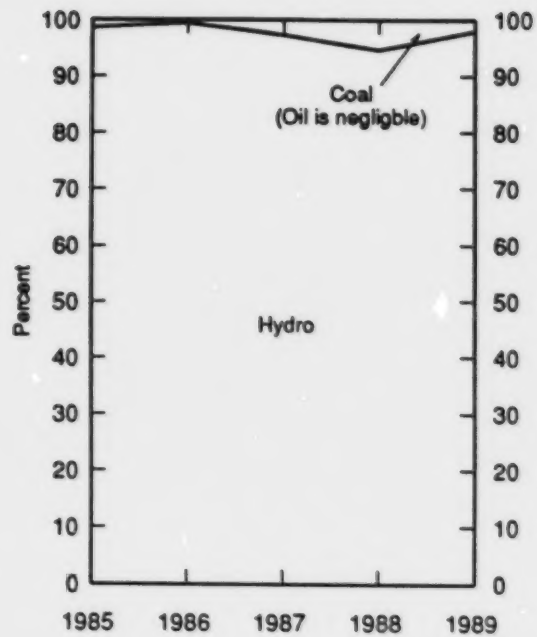
Net Generation and Consumption

(a)



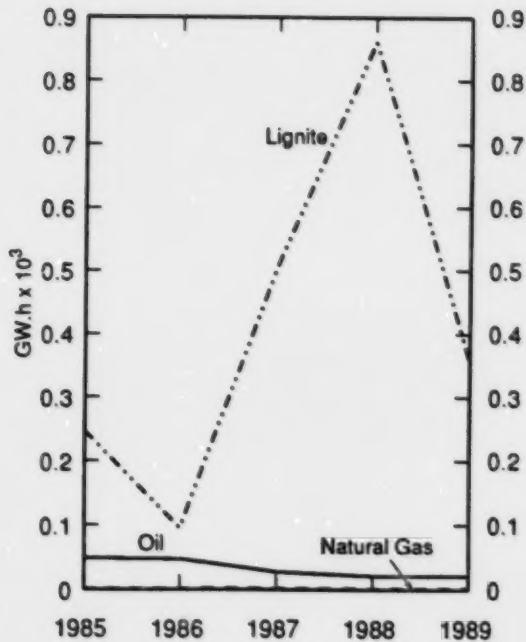
Percent of Total
Utility Net Generation

(b)



Utility Net Thermal Generation
by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)

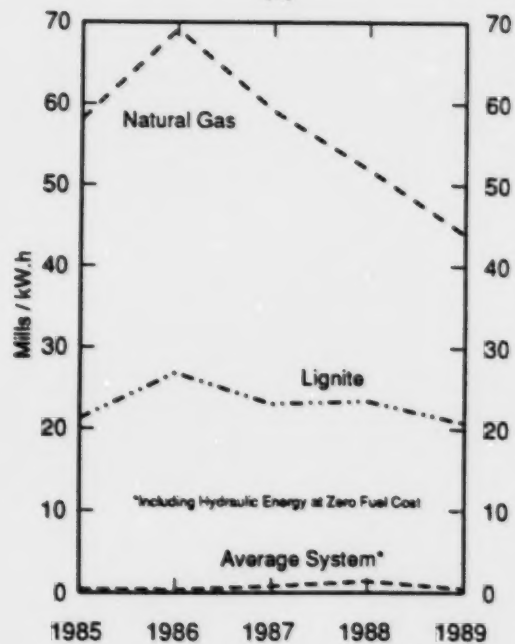
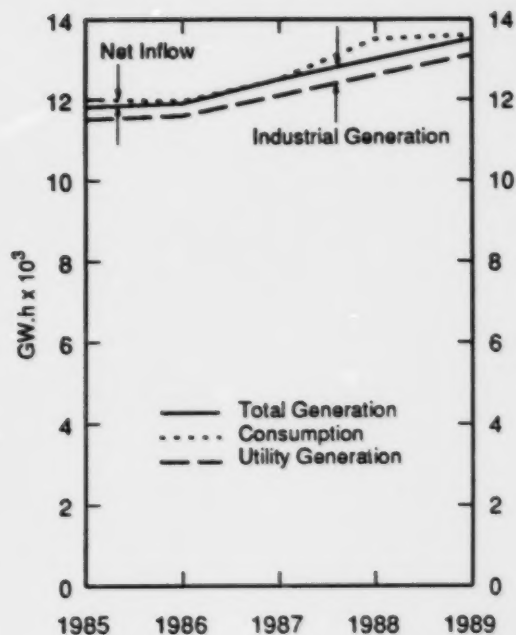


Fig. 5.9 Saskatchewan

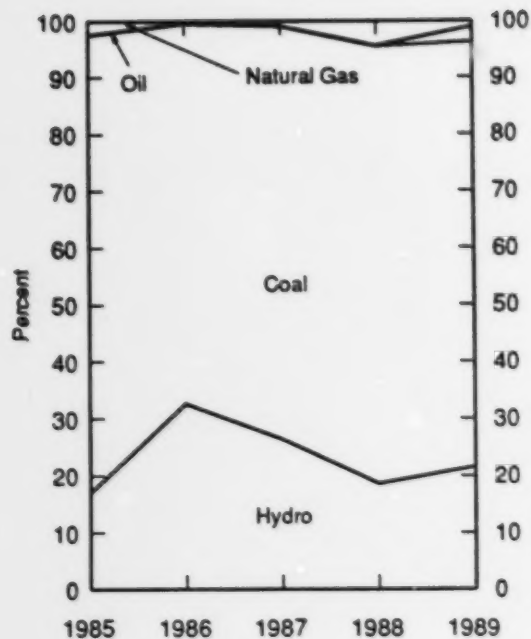
Net Generation and Consumption

(a)



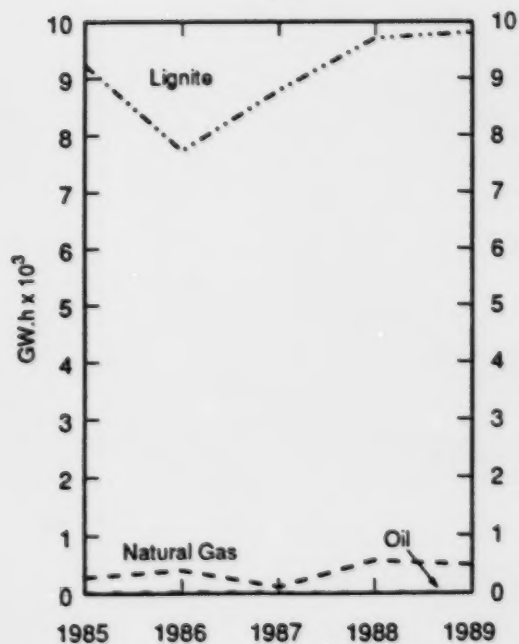
Percent of Total
Utility Net Generation

(b)



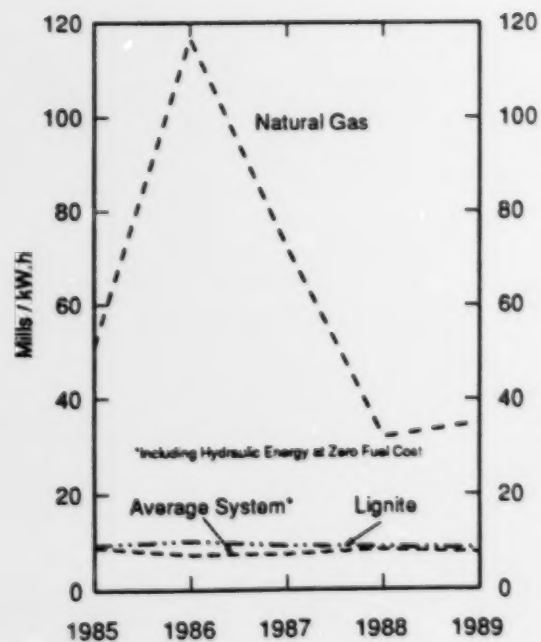
Utility Net Thermal Generation
by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



5.10 Alberta

As illustrated in Figure 5.10(a), electrical utilities' net generation increased to approximately 40 000 GW.h in 1989 from 36 900 GW.h in 1988, an increase of 8.4 percent. In-province consumption increased to 41 150 GW.h in 1989 from 39 400 GW.h in 1988, an increase of 4.4 percent. During the five-year period to 1989, in-province consumption rose at an annually compounded rate of 5.4 percent.

Figure 5.10(b) shows that in 1989, electricity generation from coal decreased to 85 percent of the total share. However, natural gas consumption to generate electricity almost doubled its share to 11 percent of the total generation. In 1989, the increase in Alberta's natural gas consumption to generate electricity was partially attributable to Alberta's natural gas generation sales to British Columbia for the export market in California.

The average system fuel cost in 1989 was 6.3 mills/kW.h, up from the previous year of 5.4 mills/kW.h. This low average system cost is primarily due to the extensive use of inexpensively extracted indigenous coal resources, and vertical integration in the coal mining and power generation industries. The 1989 increase in the average system fuel cost over 1988 was 16.7 percent. This was mainly attributable to the increase in the use of natural gas to generate electricity.

5.11 British Columbia

As shown in Figure 5.11(a), electric utilities' net generation decreased from 49 100 GW.h in 1988 to 45 600 in 1989, a decrease of 7.1 percent. This decrease in net generation is due to a low water year and resulted in a decrease in total exports to the United States from 8 851 GW.h in 1988 to 6 342 GW.h in 1989. British Columbia purchased approximately 2 300 GW.h from Alberta and imported from the United States approximately 2 000 GW.h to meet its requirements in 1989. As shown in Figure 5.11(b), 99.6 percent of total generation in 1988 was hydroelectric decreasing to approximately 91 percent of the total in 1989. The balance of generation was made up by generation from natural gas.

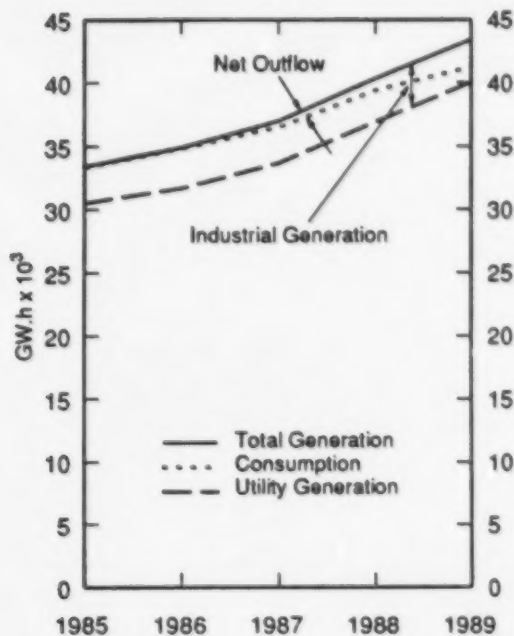
In-province consumption increased to 55 900 GW.h in 1989 from 54 300 GW.h in 1988, an increase of 3.0 percent. The five-year average annually compounded rate to 1989 was 3.3 percent.

Since 1985, the average system fuel cost, as illustrated in Figure 5.11(d), was negligible given the zero cost attributed to hydro sources and the limited use of fossil fuels. In 1989, the average system fuel cost increased to 1.6 mills/kW.h, and was attributable to the large increase in the use of natural gas to generate electricity to meet export requirements in the California market as well as British Columbia's own system integrity.

Fig. 5.10 Alberta

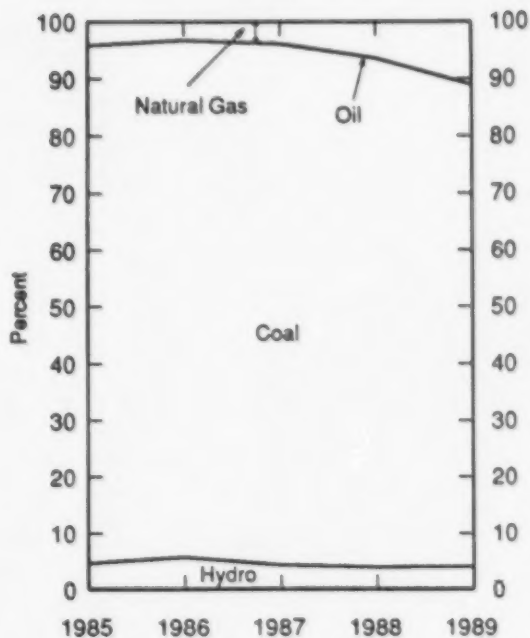
Net Generation and Consumption

(a)



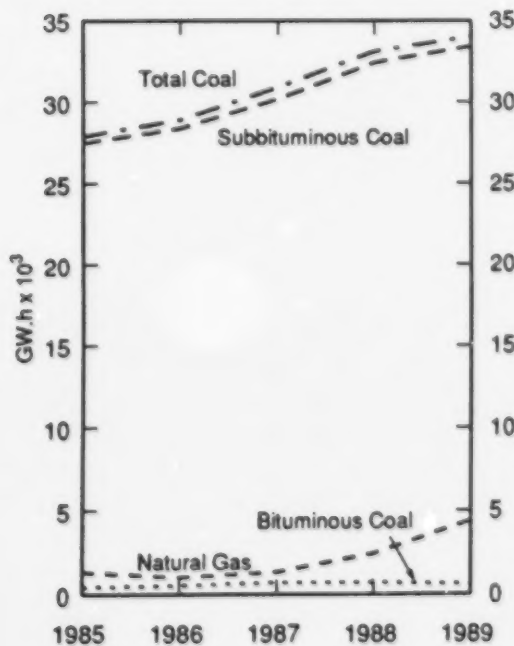
Percent of Total Utility Net Generation

(b)



Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)

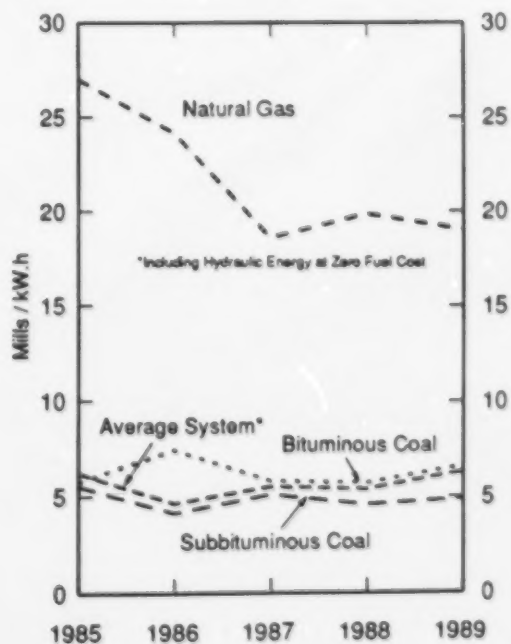
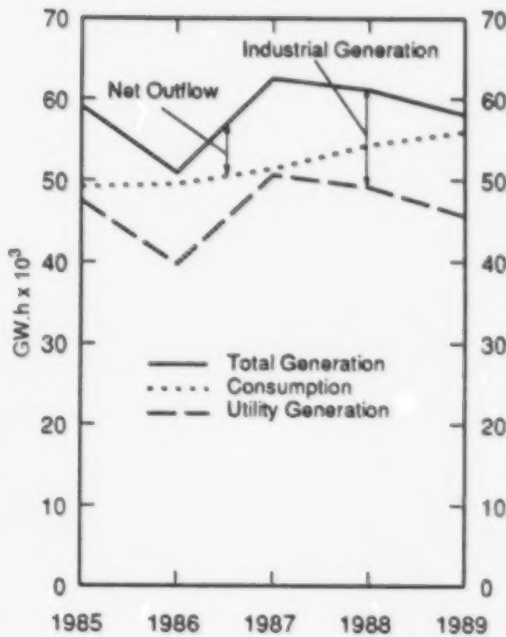


Fig. 5.11 British Columbia

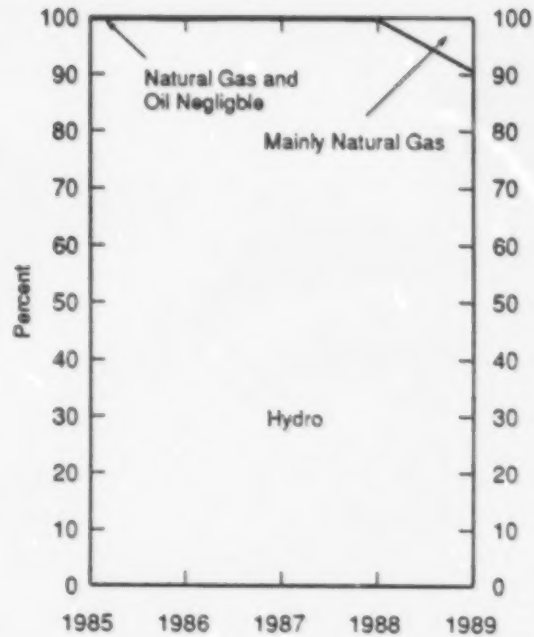
Net Generation and Consumption

(a)



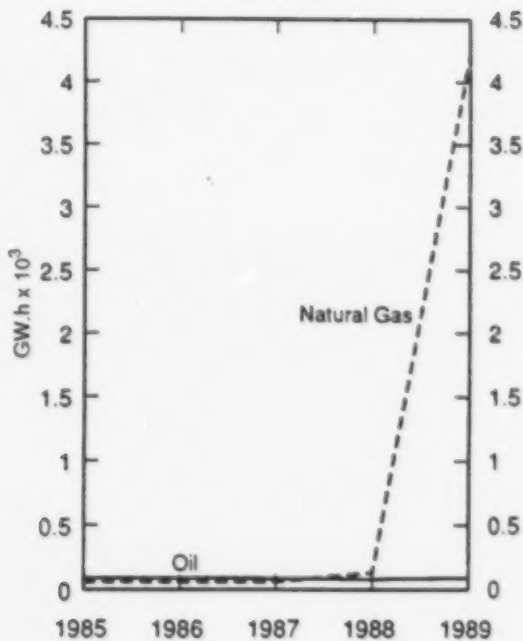
Percent of Total Utility Net Generation

(b)



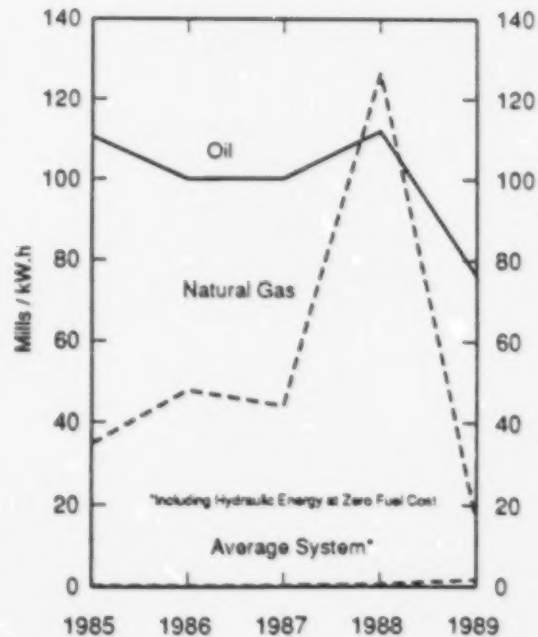
Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



5.12 Yukon

Figure 5.12(a) shows that in 1989, total generation and consumption of electricity in the Yukon increased to 440 GW.h from 439 GW.h in 1988, an increase of 0.2 percent. No industrial self-generation of electricity has been reported since 1979. Figure 5.12(b) shows that approximately 92 percent of total generation is from hydro sources and the balance oil.

The average system fuel cost in 1989 and 1988 was 6.1 mills/kW.h, up slightly from 5.4 mills/kW.h in 1987 and down from 11.3 mills/kW.h in 1985. The reduction in the average system fuel cost over the period since 1985 was largely due to the increased use of hydro generation which replaced the more expensive oil-fired generation in the interconnected system around Whitehorse. Isolated communities in the Yukon rely solely on oil-fired internal combustion units for which fuel costs have been in excess of 100 mills/kW.h in years previous to 1987. However, lower world prices for oil reduced generation costs for oil-fired combustion units to 77.2 mills/KW.h in 1989.

5.13 Northwest Territories

As illustrated in Figure 5.13(a), utility generation increased to 443 GW.h in 1989 from 435 GW.h in 1988, an increase of 1.8 percent. As shown in Figure 5.13(b), approximately 53 percent of total generation was provided by hydro facilities in 1989, a decrease of 10.2 percent from the previous year. The balance of the supply was from the oil-fired internal combustion units located mainly in isolated communities.

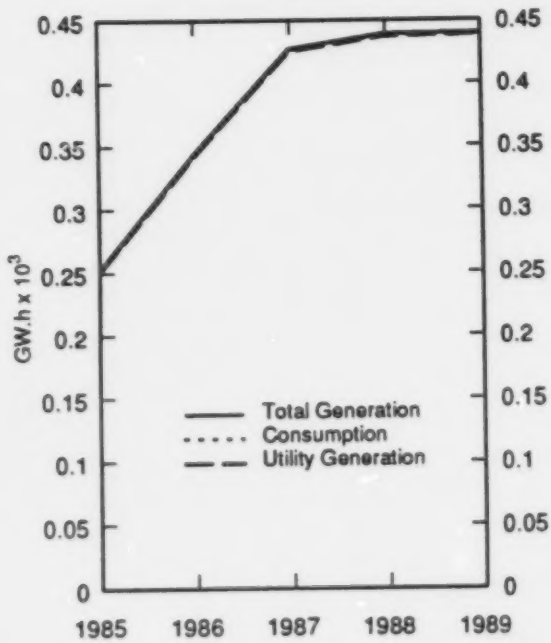
Consumption increased to 559 GW.h in 1989 from 549 GW.h in 1988, an increase of 1.8 percent over the previous year.

The average system fuel cost in 1989 was 45.7 mills/kW.h, down from 57.4 mills/kW.h in 1988, a decrease of 20.4 percent. Many isolated communities were served solely by oil-fired internal combustion units for which fuel costs exceeded 100 mills/kW.h prior to 1989. However, lower world oil prices have reduced oil-fired generation costs as illustrated in Figure 5.13(d).

Fig. 5.12 Yukon

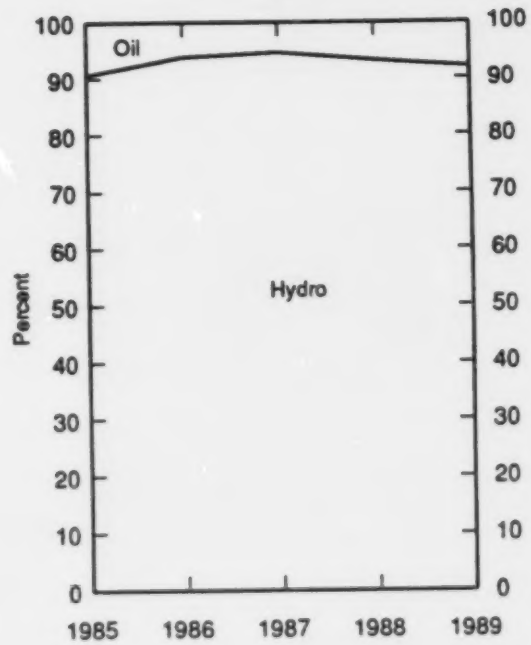
Net Generation and Consumption

(a)



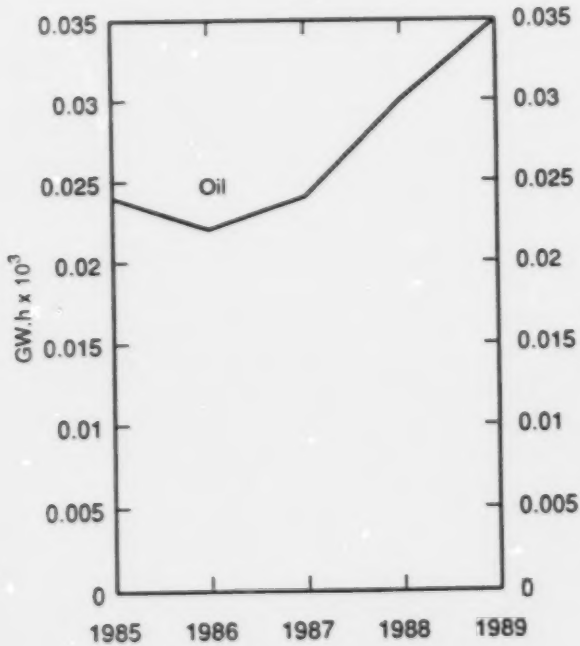
Percent of Total Utility Net Generation

(b)



Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)

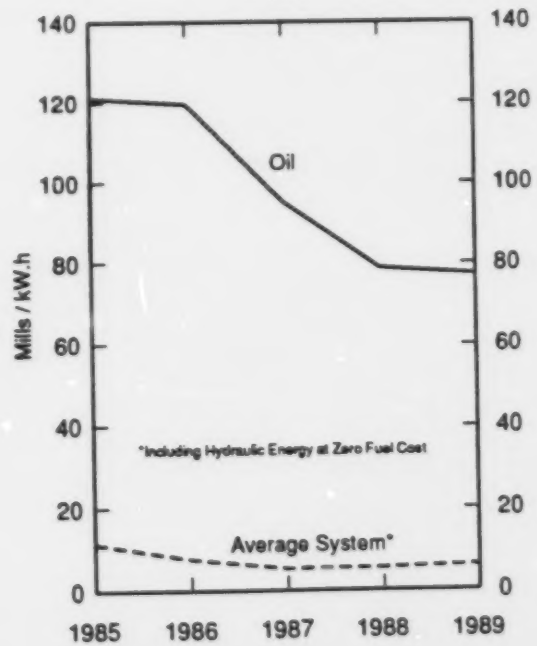
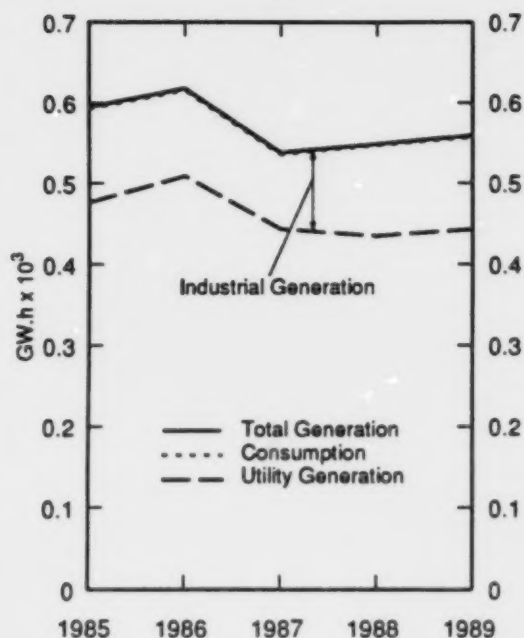


Fig. 5.13 Northwest Territories

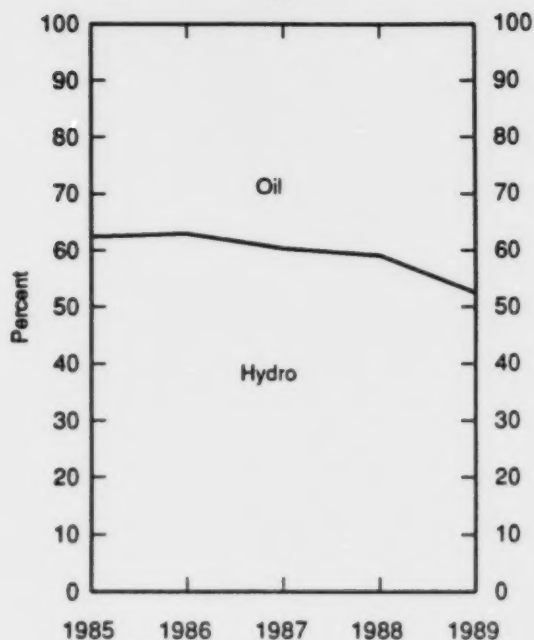
Net Generation and Consumption

(a)



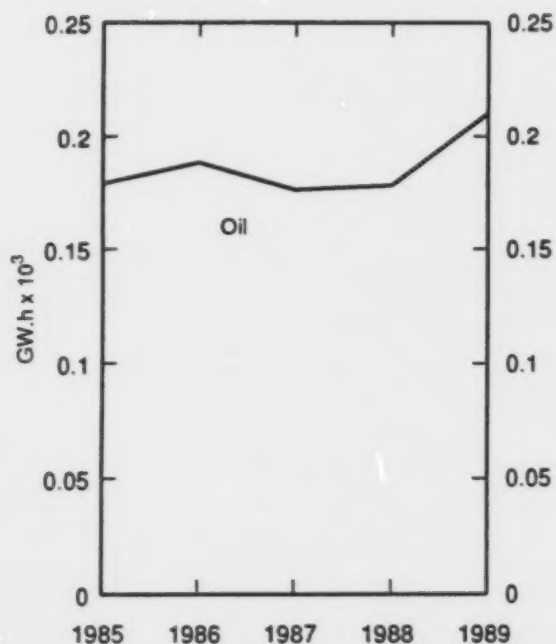
Percent of Total Utility Net Generation

(b)



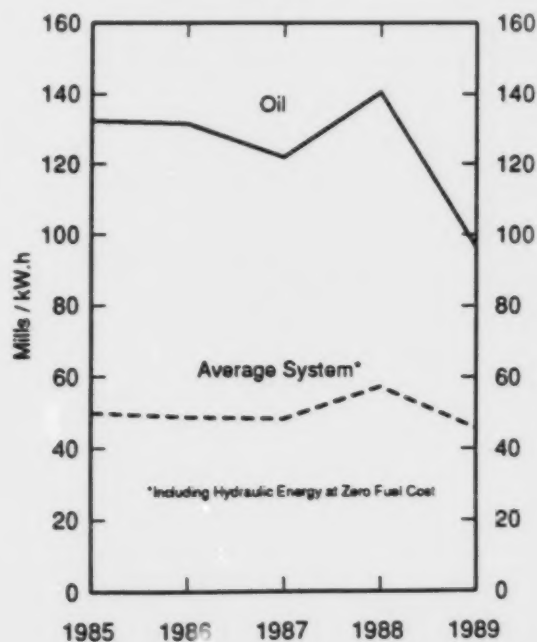
Utility Net Thermal Generation by Fuel Type

(c)



Utility Fuelling Cost by Fuel Type

(d)



*Including Hydraulic Energy at Zero Fuel Cost

6. CANADIAN POPULATION, GROSS NATIONAL PRODUCT AND
ELECTRICITY GENERATION TRENDS - 1961 - 1989

In Canada, as in other industrialized nations, there is a fundamental linkage between electricity demand and economic activity. Accordingly, we present a historical perspective of this relationship in Canada. Figure 6.A shows Canadian electrical consumption per capita plotted against real Gross National Product (GNP) per capita.

The Board has noted other studies that indicate that there is a relationship between electrical energy consumption per capita and real Gross National Product (GNP) per capita. Accordingly, as a matter of interest, an analysis of this relationship for Canada follows.

Table 6.A provides data on electrical energy consumption, real GNP and population for 1961 to 1989. The average annually compounded growth rates are about 6.8 percent, 5.5 percent and 1.7 percent, respectively, for the period 1961 to 1970 inclusive, and 5.4 percent, 3.8 percent and 1.2 percent, respectively, for the period 1971 to 1980. The five-year period to 1988 showed average annually compounded growth rates of 3.9 percent, 2.6 percent, and 1.0 percent respectively. Based on the historical data from 1961 to 1989 inclusive presented in Table 6.A, a least square line was developed for per capita electricity consumption and per capita real GNP and is displayed in Figure 6.A. This illustrates the relationship between per capita electricity consumption and per capita real GNP for which the statistical correlation coefficient is 0.998.

Table 6.B provides data on the behaviour of the real average price of electricity between 1970 and 1989 (1981 \$). The long-term trend exhibited a steady decline until 1974 and an increasing trend to 1979. After leveling off during 1979 and 1980, the average price dropped to 31.5 mills/kW.h (1981 \$) in 1981 and rose steadily to 33.8 mills/kW.h in 1985. The average selling price declined to 31.4 mills/kW.h in 1988 and increased slightly to 31.5 mill/kW.h in 1989. Over the ten-year period to 1989, the real price of electricity was relatively constant at about 32.4 mills/kW.h $\pm$ 0.5 mills.

Per Capita Electricity
Consumption (kWh)

Figure 6.A
Per Capita Electricity Consumption vs. Per Capita GNP

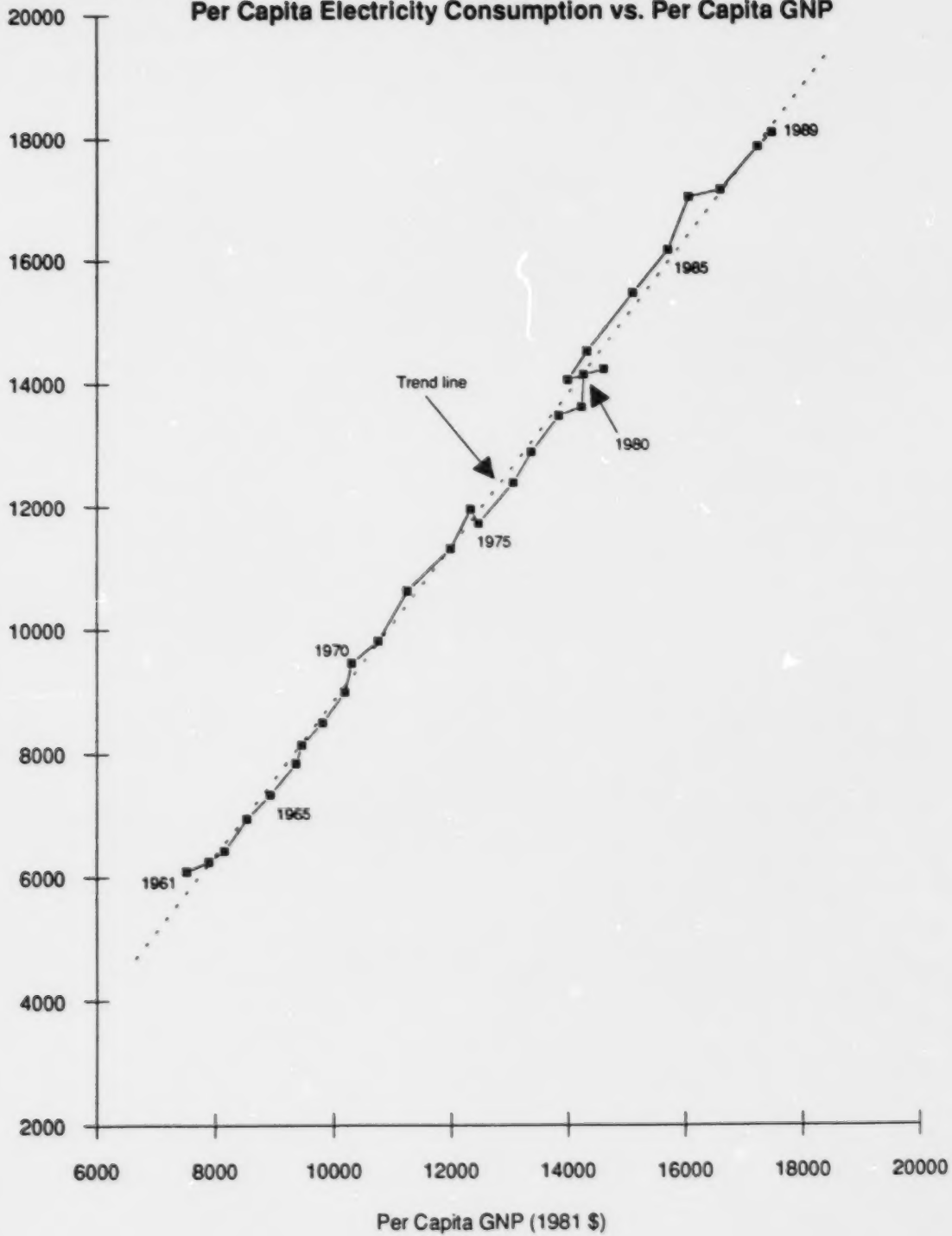


TABLE 6.A

GNP, ELECTRICAL ENERGY CONSUMPTION
AND POPULATION FOR CANADA

YEAR	GNP (BILLION 1981\$)	ELEC.(*) CONSUMPTION (BILLION Kw.h)	POPULATION ('000 000)	GNP/CAPITA (1981\$)	CONSUMPTION/ CAPITA (kw.h)
1961	136.914	110.950	18.238	7507.1	6083.5
1962	146.614	116.135	18.583	7889.7	6249.5
1963	154.224	121.510	18.931	8146.6	6418.6
1964	164.504	133.949	19.291	8527.5	6943.6
1965	175.359	144.165	19.644	8926.8	7338.9
1966	187.263	156.956	20.015	9356.1	7841.9
1967	192.752	165.812	20.378	9458.8	8136.8
1968	203.072	175.849	20.701	9809.8	8494.7
1969	213.946	188.648	21.001	10187.4	8982.8
1970	219.498	201.298	21.297	10306.5	9451.9
1971	232.137	211.492	21.568	10763.0	9805.8
1972	245.441	231.557	21.802	11257.7	10620.9
1973	264.369	249.298	22.043	11993.3	11309.6
1974	276.006	267.298	22.364	12341.5	11952.2
1975	283.187	265.995	22.697	12476.8	11719.4
1976	300.638	284.829	22.993	13075.2	12387.6
1977	311.504	299.929	23.273	13384.8	12887.4
1978	325.751	316.827	23.517	13851.7	13472.3
1979	338.362	323.469	23.747	14248.6	13621.5
1980	343.384	340.068	24.043	14282.1	14144.2
1981	355.994	346.332	24.342	14624.7	14227.8
1982	344.543	345.437	24.583	14015.5	14051.9
1983	355.445	359.751	24.787	14340.0	14513.7
1984	377.865	386.322	24.978	15127.9	15466.5
1985	395.878	406.859	25.165	15731.3	16167.7
1986	408.143	432.029	25.353	16098.4	17040.5
1987	426.411	439.599	25.617	16645.6	17160.4
1988	447.779	462.948	25.912	17280.8	17866.2
1989	459.370	474.358	26.219	17520.5	18092.1

(*) Total made available in Canada.

TABLE 6.B

AVERAGE SELLING PRICE OF ELECTRICITY

YEAR	REVENUE '000 000 \$	SALES(*) '000 000 kW.h	MILLS/kW.h (CURRENT \$)	C.P.I.(**) DEFLATOR	MILLS/kW.h (1981 \$)
1970	1 716	137 972	12.4	0.410	30.2
1971	1 878	147 203	12.8	0.422	30.3
1972	2 065	162 729	12.7	0.442	28.7
1973	2 326	177 724	13.1	0.476	27.5
1974	2 677	193 329	13.8	0.528	26.1
1975	3 114	194 571	16.0	0.585	27.4
1976	3 852	213 612	18.0	0.629	28.6
1977	4 842	226 004	21.4	0.679	31.5
1978	5 612	235 975	23.8	0.739	32.2
1979	6 425	245 537	26.2	0.807	32.5
1980	7 355	254 684	28.9	0.889	32.5
1981	8 371	265 930	31.5	1.000	31.5
1982	9 684	264 289	36.6	1.108	33.0
1983	10 722	272 555	39.3	1.172	33.5
1984	12 150	295 852	41.1	1.223	33.6
1985	13 437	312 773	43.0	1.272	33.8
1986	14 853	350 134	42.4	1.324	32.0
1987	15 955	366 575	43.5	1.382	31.5
1988	17 427	386 392	45.1	1.438	31.4
1989	18 794	395 624	47.5	1.510	31.5

(*) Total sales to ultimate customers.

(**) C.P.I. Deflator in 1981\$.

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Appendix



TABLE 1.1
ELECTRIC UTILITIES
PROVINCIAL INSTALLED CAPACITY AND GENERATION
BY PRIMARY ENERGY SOURCE
1989

PROVINCE/TERRITORY	FOSSIL FUELLED		NUCLEAR		HYDROELECTRIC		TOTAL	
	MW	GW.h	MW	GW.h	MW	GW.h	MW	GW.h
Newfoundland	781.0	2 119.3	0.0	0.0	6 571.4	32 357.8	7 352.4	34 477.1
Prince Edward Island	122.1	104.4	0.0	0.0	0.0	0.0	122.1	104.4
Nova Scotia	1 722.3	7 943.5	0.0	0.0	381.4	932.8	2 103.7	8 876.3
New Brunswick	1 795.6	9 150.0	680.0	5 268.8	885.6	2 334.0	3 361.2	16 752.8
Québec	1 072.7	1 619.2	685.0	4 849.5	23 954.4	122 005.6	25 712.1	128 474.3
Ontario	13 205.0	35 350.7	11 238.0	65 261.4	7 495.5	36 923.3	31 938.5	137 535.4
Manitoba	418.3	378.5	0.0	0.0	3 641.1	18 328.9	4 059.4	18 707.4
Saskatchewan	1 930.6	10 293.1	0.0	0.0	835.9	2 838.6	2 766.5	13 131.7
Alberta	6 821.2	38 383.9	0.0	0.0	733.7	1 597.6	7 554.9	39 981.5
British Columbia	1 134.3	4 295.7	0.0	0.0	9 544.2	41 274.0	10 678.5	45 569.7
Yukon	44.6	35.0	0.0	0.0	81.7	405.3	126.3	440.3
Northwest Territories	122.2	210.2	0.0	0.0	50.0	232.8	172.2	443.0
Canada	29 169.9	109 883.5	12 603.0	75 379.7	54 174.9	259 230.7	95 947.8	444 493.9

Note: For breakdown of fossil fuelled, see Table 1.4.

TABLE 1.2
ELECTRIC UTILITIES
PROVINCIAL INSTALLED CAPACITY AND GENERATION
BY PRIMARY ENERGY SOURCE
PERCENT OF CANADIAN TOTALS
1989

PROVINCE/TERRITORY	FOSSIL FUELLED		NUCLEAR		HYDROELECTRIC		TOTAL	
	MW	GW.h	MW	GW.h	MW	GW.h	MW	GW.h
Newfoundland	2.7	1.9	0.0	0.0	12.1	12.5	7.7	7.8
Prince Edward Island	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Nova Scotia	5.9	7.2	0.0	0.0	0.7	0.4	2.2	2.0
New Brunswick	6.2	8.3	5.4	7.0	1.6	0.9	3.5	3.8
Québec	3.7	1.5	5.4	6.4	44.2	47.1	26.8	28.9
Ontario	45.3	32.2	89.2	86.6	13.8	14.2	33.3	30.9
Manitoba	1.4	0.3	0.0	0.0	6.7	7.1	4.2	4.2
Saskatchewan	6.6	9.4	0.0	0.0	1.5	1.1	2.9	3.0
Alberta	23.4	34.9	0.0	0.0	1.4	0.6	7.9	9.0
British Columbia	3.9	3.9	0.0	0.0	17.5	15.9	11.1	10.3
Yukon	0.2	0.0	0.0	0.0	0.2	0.2	0.1	0.1
Northwest Territories	0.4	0.2	0.0	0.0	0.1	0.1	0.2	0.1
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: For breakdown of fossil fuelled, see Table 1.5.
Totals may not add due to independent rounding.

TABLE 1.3
ELECTRIC UTILITIES
PROVINCIAL INSTALLED CAPACITY AND GENERATION
BY PRIMARY ENERGY SOURCE
PERCENT OF PROVINCIAL TOTALS
1989

PROVINCE/TERRITORY	FOSSIL FUELLED		NUCLEAR		HYDROELECTRIC		TOTAL	
	MW	GW.h	MW	GW.h	MW	GW.h	MW	GW.h
Newfoundland	10.6	6.1	0.0	0.0	89.4	93.9	100.0	100.0
Prince Edward Island	100.0	100.0	0.0	0.0	0.0	0.0	100.0	100.0
Nova Scotia	81.9	89.5	0.0	0.0	18.1	10.5	100.0	100.0
New Brunswick	53.4	54.6	20.2	31.5	26.3	13.9	100.0	100.0
Québec	4.2	1.3	2.7	3.8	93.2	95.0	100.0	100.0
Ontario	41.3	25.7	35.2	47.5	23.5	26.8	100.0	100.0
Manitoba	10.3	2.0	0.0	0.0	89.7	98.0	100.0	100.0
Saskatchewan	69.8	78.4	0.0	0.0	30.2	21.6	100.0	100.0
Alberta	90.3	96.0	0.0	0.0	9.7	4.0	100.0	100.0
British Columbia	10.6	9.4	0.0	0.0	89.4	90.6	100.0	100.0
Yukon	35.3	7.9	0.0	0.0	64.7	92.1	100.0	100.0
Northwest Territories	71.0	47.4	0.0	0.0	29.0	52.6	100.0	100.0
Canada	30.4	24.7	13.1	17.0	56.5	58.3	100.0	100.0

Note: For breakdown of fossil fuelled, see Table 1.6.
Totals may not add due to independent rounding.

TABLE 1.4
ELECTRIC UTILITIES
PROVINCIAL FOSSIL CAPACITY AND GENERATION
1989

PROVINCE/TERRITORY	*****GENERATION(GW.h)*****					TOTAL	CAPACITY TOTAL MW
	*****STEAM*****			INT COMB	GAS TURBINE		
	OIL	GAS	COAL				
Newfoundland	2023.1	0.0	0.0	91.3	4.9	2119.3	781.0
Prince Edward Island	96.6	0.0	0.0	0.0	7.8	104.4	122.1
Nova Scotia	2380.8	0.0	5494.9	0.0	67.8	7943.5	1722.3
New Brunswick	7149.0	0.0	1991.7	0.3	9.0	9150.0	1795.6
Québec	1353.5	0.0	0.0	220.6	45.1	1619.2	1072.7
Ontario	1435.6	3.4	33875.2	1.8	34.7	35350.7	13205.0
Manitoba	0.9	1.5	355.8	20.3	0.0	378.5	418.3
Saskatchewan	1.2	401.4	9803.6	2.6	84.3	10293.1	1930.6
Alberta	3.4	3807.6	33944.3	15.7	612.9	38383.9	6821.2
British Columbia	0.0	4152.9	0.0	141.2	1.6	4295.7	1134.3
Yukon	0.0	0.0	0.0	35.0	0.0	35.0	44.6
Northwest Territories	0.0	0.0	0.0	210.2	0.0	210.2	122.2
Canada	14444.1	8366.8	85465.5	739.0	868.1	109683.5	29169.9

TABLE 1.5
ELECTRIC UTILITIES
PROVINCIAL FOSSIL CAPACITY AND GENERATION
PERCENT OF CANADIAN TOTALS
1989

PROVINCE/TERRITORY	*****GENERATION(GW.h)*****					TOTAL	CAPACITY TOTAL MW
	*****STEAM*****			INT COMB	GAS TURBINE		
	OIL	GAS	COAL				
Newfoundland	14.0	0.0	0.0	12.4	0.6	1.9	2.7
Prince Edward Island	0.7	0.0	0.0	0.0	0.9	0.1	0.4
Nova Scotia	16.5	0.0	6.4	0.0	7.8	7.2	5.9
New Brunswick	49.5	0.0	2.3	0.0	1.0	8.3	6.2
Québec	9.4	0.0	0.0	29.9	5.2	1.5	3.7
Ontario	9.9	0.0	39.6	0.2	4.0	32.2	45.3
Manitoba	0.0	0.0	0.4	2.7	0.0	0.3	1.4
Saskatchewan	0.0	4.8	11.5	0.4	9.7	9.4	6.6
Alberta	0.0	45.5	39.7	2.1	70.6	34.9	23.4
British Columbia	0.0	49.6	0.0	19.1	0.2	3.9	3.9
Yukon	0.0	0.0	0.0	4.7	0.0	0.0	0.2
Northwest Territories	0.0	0.0	0.0	28.4	0.0	0.2	0.4
Canada	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Totals may not add due to independent rounding.

TABLE 1.6
ELECTRIC UTILITIES
PROVINCIAL FOSSIL CAPACITY AND GENERATION
PERCENT OF PROVINCIAL TOTALS
1989

PROVINCE/TERRITORY	*****GENERATION(GW.h)*****					TOTAL	CAPACITY TOTAL MW
	*****STEAM*****			INT COMB	GAS TURBINE		
	OIL	GAS	COAL				
Newfoundland	95.5	0.0	0.0	4.3	0.2	100.0	100.0
Prince Edward Island	92.5	0.0	0.0	0.0	7.5	100.0	100.0
Nova Scotia	30.0	0.0	69.2	0.0	0.9	100.0	100.0
New Brunswick	78.1	0.0	21.8	0.0	0.1	100.0	100.0
Québec	83.6	0.0	0.0	13.6	2.8	100.0	100.0
Ontario	4.1	0.0	95.8	0.0	0.1	100.0	100.0
Manitoba	0.2	0.4	94.0	5.4	0.0	100.0	100.0
Saskatchewan	0.0	3.9	95.2	0.0	0.8	100.0	100.0
Alberta	0.0	9.9	88.4	0.0	1.6	100.0	100.0
British Columbia	0.0	96.7	0.0	3.3	0.0	100.0	100.0
Yukon	0.0	0.0	0.0	100.0	0.0	100.0	100.0
Northwest Territories	0.0	0.0	0.0	100.0	0.0	100.0	100.0
Canada	13.1	7.6	77.8	0.7	0.8	100.0	100.0

Note: Totals may not add due to independent rounding.

TABLE 1.7
ELECTRIC UTILITIES
PROVINCIAL GENERATION BY TYPE OF COAL AND OIL (GW.h)
1989

PROVINCE/TERRITORY	COAL					OIL			
	BITUMINOUS CANADIAN	BITUMINOUS IMPORTED	SUBBITUMINOUS	LIGNITE	TOTAL COAL	LIGHT	HEAVY	DIESEL	TOTAL OIL
Newfoundland	0.0	0.0	0.0	0.0	0.0	3.8	2022.3	93.2	2119.3
Prince Edward Island	0.0	0.0	0.0	0.0	0.0	0.0	96.6	7.8	104.4
Nova Scotia	5494.9	0.0	0.0	0.0	5494.9	16.5	2364.2	67.9	2448.6
New Brunswick	1455.7	536.0	0.0	0.0	1991.7	12.5	7136.5	9.3	7158.3
Québec	0.0	0.0	0.0	0.0	0.0	45.1	1353.5	220.6	1619.2
Ontario	7765.9	23798.3	0.0	2311.0	33875.2	165.4	1305.2	0.5	1471.1
Manitoba	0.0	0.0	0.0	355.8	355.8	0.9	0.0	20.3	21.2
Saskatchewan	0.0	0.0	13.2	9790.4	9803.6	1.2	0.0	2.6	3.8
Alberta	557.9	0.0	33386.4	0.0	33944.3	0.0	2.7	16.4	19.1
British Columbia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.9	85.9
Yukon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.0	35.0
Northwest Territories	0.0	0.0	0.0	0.0	0.0	0.0	0.0	210.2	210.2
Canada	15274.4	24334.3	33399.6	12457.2	85465.5	245.4	14281.0	799.7	15296.1

TABLE 1.8
ELECTRIC UTILITIES
GENERATION DATA FOR CANADA
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ KW.h
Coal									
-Bituminous	14715.5	27994.7	861245.2	39.3	39608.7	8.9	58.526	2.09	21.74
-Subbituminous	19942.5	18541.8	162887.9	7.4	33399.6	7.5	8.168	0.44	4.88
-Lignite	10538.9	14708.4	147585.6	6.7	12457.2	2.8	14.004	0.95	11.85
-Total	45196.9	20725.7	1171718.7	53.5	85465.5	19.2	25.925	1.25	13.71
Oil									
-Light	77562.0	38559.8	17192.3	0.8	245.4	0.1	221.659	5.75	70.06
-Heavy	3706040.0	41568.2	404805.0	18.5	14281.0	3.2	109.228	2.63	28.35
-Diesel	242827.0	37697.6	53306.5	2.4	769.7	0.2	219.525	5.82	69.26
-Total	4026429.0	41276.8	475303.8	21.7	15296.1	3.4	118.046	2.86	31.07
Natural gas	2744.2	38003.0	169514.3	7.7	9121.9	2.1	61.772	1.63	18.58
Uranium	1321972.0	695146.4	373159.7	17.0	75379.7	17.0	282.275	0.41	4.95
Hydroelectric					259230.7	58.3			
Total			2189696.5	100.0	444493.9	100.0			4.93

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.1
ELECTRIC UTILITIES
GENERATION DATA FOR NEWFOUNDLAND
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Oil									
-Light	1805.0	38222.9	416.9	0.7	3.8	0.0	230.970	6.04	109.71
-Heavy	531422.0	41807.0	52067.3	88.2	2022.3	5.9	98.015	2.34	25.76
-Diesel	29852.0	38466.5	6532.5	11.1	93.2	0.3	218.830	5.69	70.09
-Total	563079.0	41618.4	59036.7	100.0	2119.3	6.1	104.846	2.52	27.86
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					32357.8	93.9			
Total			59036.7	100.0	34477.1	100.0			1.71

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.2
ELECTRIC UTILITIES
GENERATION DATA FOR PRINCE EDWARD ISLAND
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Oil									
-Light	45.0	39450.0	8.2	0.2	0.0	0.0	182.222	4.60	*****
-Heavy	35456.0	41392.8	4442.4	87.5	96.6	92.5	125.293	3.03	45.99
-Diesel	3245.0	38680.0	625.5	12.3	7.8	7.5	192.758	4.98	80.19
-Total	38746.0	41163.3	5076.1	100.0	104.4	100.0	131.010	3.18	48.62
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					0.0	0.0			
Total			5076.1	100.0	104.4	100.0			48.62

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.3
ELECTRIC UTILITIES
GENERATION DATA FOR NOVA SCOTIA
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	2141.2	27502.4	148896.1	68.6	5494.9	61.9	60.530	2.53	27.10
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	2141.2	0.0	148896.1	68.6	5494.9	61.9	60.539	2.53	27.10
Oil									
-Light	5371.0	37602.7	995.2	0.5	16.5	0.2	185.291	4.93	60.32
-Heavy	597604.0	41845.5	62865.3	29.0	2364.2	26.6	105.196	2.51	26.59
-Diesel	23633.0	37581.1	4287.5	2.0	67.9	0.8	181.420	4.83	63.14
-Total	626608.0	41648.3	68148.0	31.4	2448.6	27.6	108.757	2.61	27.83
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					932.8	10.5			
Total			217044.1	100.0	8876.3	100.0			24.45

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.4
ELECTRIC UTILITIES
GENERATION DATA FOR NEW BRUNSWICK
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ KWH
Coal									
-Bituminous	777.7	28171.4	55874.5	22.6	1991.7	11.9	71.846	2.55	28.05
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	777.7	28171.4	55874.5	22.6	1991.7	11.9	71.846	2.55	28.05
Oil									
-Light	3893.0	38741.0	653.2	0.3	12.5	0.1	167.788	4.33	52.26
-Heavy	1774636.0	41409.0	175462.2	70.9	7136.5	42.6	98.872	2.39	24.59
-Diesel	4172.0	39104.3	957.1	0.4	9.3	0.1	229.410	5.87	102.91
-Total	1782701.0	41397.8	177072.5	71.6	7158.3	42.7	99.328	2.40	24.74
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	105822.0	576200.0	14391.1	5.8	5268.8	31.5	135.993	0.24	2.73
Hydroelectric					2334.0	13.9			
Total			247338.1	100.0	16752.8	100.0			14.78

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.5
ELECTRIC UTILITIES
GENERATION DATA FOR QUÉBEC
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$/'000	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Oil									
-Light	16425.0	38680.0	4053.0	5.9	45.1	0.0	246.758	6.38	89.87
-Heavy	405585.0	41475.0	46223.6	67.3	1353.5	1.1	113.968	2.75	34.15
-Diesel	66175.0	38295.0	8222.1	12.0	220.6	0.2	124.248	3.24	37.27
-Total	488185.0	40949.9	58498.7	85.1	1619.2	1.3	119.829	2.93	36.13
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	89235.0	674000.0	10208.0	14.9	4849.5	3.8	114.395	0.17	2.10
Hydroelectric					122005.6	95.0			
Total			68706.7	100.0	128474.3	100.0			9.53

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.6
ELECTRIC UTILITIES
GENERATION DATA FOR ONTARIO
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	11219.7	28704.2	652787.0	57.7	31564.2	22.9	58.182	2.03	20.68
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	1589.7	16168.5	55290.8	4.9	2311.0	1.7	34.781	2.15	23.93
-Total	12809.4	27148.5	708077.8	62.6	33875.2	24.6	55.278	2.04	20.90
Oil									
-Light	49322.0	38601.5	10950.3	1.0	165.4	0.1	222.017	5.75	66.20
-Heavy	360405.0	41660.0	63649.2	5.6	1305.2	0.9	176.605	4.24	48.77
-Diesel	178.0	37705.0	44.7	0.0	0.5	0.0	251.124	6.66	89.40
-Total	409905.0	41290.3	74644.2	6.6	1471.1	1.1	182.101	4.41	50.74
Natural gas	1.4	37338.7	356.2	0.0	4.4	0.0	254.429	6.92	80.95
Uranium	1126915.0	707990.4	348560.5	30.8	65261.4	47.5	309.305	0.44	5.34
Hydroelectric					36923.3	26.8			
Total			1131638.7	100.0	137535.4	100.0			8.23

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.7
ELECTRIC UTILITIES
GENERATION DATA FOR MANITOBA
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$/'000	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	327.7	16221.0	7375.4	78.4	355.8	1.9	22.506	1.39	20.73
-Total	327.7	16221.0	7375.4	78.4	355.8	1.9	22.506	1.39	20.73
Oil									
-Light	328.0	39401.9	61.7	0.7	0.9	0.0	188.110	4.77	68.56
-Heavy	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Diesel	6800.0	39000.0	1900.0	20.2	20.3	0.1	279.412	7.16	93.60
-Total	7128.0	39018.5	1961.7	20.9	21.2	0.1	275.210	7.05	92.53
Natural gas	0.6	37223.0	64.7	0.7	1.5	0.0	107.833	2.93	43.13
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					18328.9	98.0			
Total			9401.8	100.0	18707.4	100.0			9.50

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.8
ELECTRIC UTILITIES
GENERATION DATA FOR SASKATCHEWAN
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$/'000	% TOTAL FUEL COST	GENERATION GWh	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kWh
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	11.2	17500.0	272.0	0.3	13.2	0.1	24.305	1.39	20.61
-Lignite	8621.4	14381.7	84919.4	82.9	9790.4	74.6	9.850	0.68	8.67
-Total	8632.6	14385.7	85191.4	83.1	9803.6	74.7	9.869	0.69	8.69
Oil									
-Light	373.0	4042.4	53.8	0.1	1.2	0.0	144.236	3.57	44.83
-Heavy	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Diesel	883.0	38000.0	204.5	0.2	2.6	0.0	231.997	6.10	78.55
-Total	1256.0	38718.8	258.3	0.3	3.8	0.0	205.653	5.31	67.97
Natural gas	187.2	37537.9	17021.4	16.6	485.7	3.7	90.926	2.42	35.05
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					2838.6	21.6			
Total			102471.1	100.0	13131.7	100.0			7.86

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.9
ELECTRIC UTILITIES
GENERATION DATA FOR ALBERTA
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$/GJ (3)	% TOTAL FUEL COST	GENERATION GWh	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILL\$/ KWh
Coal									
-Bituminous	576.9	15786.0	3687.6	1.5	557.9	1.4	8.392	0.40	6.51
-Subbituminous	19931.4	18542.4	162615.9	84.7	33386.4	83.5	8.159	0.44	4.87
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	20508.3	18464.8	166303.5	86.1	33944.3	84.9	8.109	0.44	4.90
Oil									
-Light	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Heavy	932.0	42450.0	75.0	0.0	2.7	0.0	80.472	1.90	27.78
-Diesel	4923.0	37911.0	1045.8	0.4	16.4	0.0	212.431	5.60	63.77
-Total	5855.0	38633.5	1120.8	0.4	19.1	0.0	191.426	4.96	58.68
Natural gas	1369.0	37670.7	84066.3	33.4	4420.5	11.1	60.090	1.60	19.02
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					1597.6	4.0			
Total			251490.8	100.0	39961.5	100.0			8.29

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.10
ELECTRIC UTILITIES
GENERATION DATA FOR BRITISH COLUMBIA
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$/'000	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Oil									
-Light	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Heavy	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Diesel	26930.0	36145.8	6534.3	8.8	85.9	0.2	242.640	6.71	76.07
-Total	26930.0	36145.8	6534.3	8.8	85.9	0.2	242.640	6.71	76.07
Natural gas	1156.1	38481.7	68005.7	91.2	4209.8	9.2	58.823	1.53	16.15
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					41274.0	90.6			
Total			74540.0	100.0	45589.7	100.0			1.84

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.11
ELECTRIC UTILITIES
GENERATION DATA FOR YUKON
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ kW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Oil									
-Light	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Heavy	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Diesel	9723.0	30680.0	2701.5	100.0	35.0	7.9	277.846	7.18	77.19
-Total	9723.0	30680.0	2701.5	100.0	35.0	7.9	277.846	7.18	77.19
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					405.3	92.1			
Total			2701.5	100.0	440.3	100.0			8.14

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 2.12
ELECTRIC UTILITIES
GENERATION DATA FOR NORTHWEST TERRITORIES
1989

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST \$/('000)	% TOTAL FUEL COST	GENERATION GW.h	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST \$/GJ	MILLS/ KW.h
Coal									
-Bituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Subbituminous	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Lignite	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Oil									
-Light	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Heavy	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
-Diesel	66313.0	36993.0	20251.0	100.0	210.2	47.4	305.385	8.23	96.34
-Total	66313.0	36993.0	20251.0	100.0	210.2	47.4	305.385	8.23	96.34
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Uranium	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.00	0.00
Hydroelectric					232.8	52.6			
Total			20251.0	100.0	443.0	100.0			45.71

Note: (1) Quantity consumed is measured in thousands of tonnes (coal), kilolitres (oil), millions of cubic metres (gas), and kilograms (contained uranium).

(2) Average heat content is measured in kilojoules/kilogram (coal), kilojoules/litre (oil), kilojoules/cubic metre (gas), and kilojoules/gram (contained uranium).

(3) Unit quantity is measured in tonnes (coal), kilolitres (oil), thousands of cubic metres (gas), and kilograms (contained uranium).

Totals may not add due to independent rounding.

TABLE 3.1
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
BITUMINOUS COAL
1989

PROVINCE/TERRITORY	QUANTITY TONNES	HEAT CONTENT kJ/kg	COST '000 \$	GENERATION GW.h	COST		
					\$/Tonne	\$/GJ	mill\$/W.h
Newfoundland	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Prince Edward Island	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Nova Scotia	2141195.0	27502.4	148896.1	5494.9	69.539	2.528	27.10
New Brunswick	777725.0	28171.4	55874.5	1981.7	71.844	2.550	28.05
Québec	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Ontario	11219733.0	28704.2	632787.0	31564.2	58.182	2.027	20.68
Manitoba	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Saskatchewan	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Alberta	576856.0	15785.0	3687.6	557.9	6.393	0.405	6.61
British Columbia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	14715510.0	27994.7	861345.2	39808.7	58.526	2.091	21.74

TABLE 3.2
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
SUBBITUMINOUS COAL
1989

PROVINCE/TERRITORY	QUANTITY TONNES	HEAT CONTENT kJ/kg	COST '000 \$	GENERATION GW.h	***** \$/Tonne	COST***** \$/GJ	MILLS/KW.h
Newfoundland	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Prince Edward Island	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Nova Scotia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
New Brunswick	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Québec	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Ontario	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Manitoba	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Saskatchewan	11150.0	17500.0	272.0	13.2	24.395	1.394	20.61
Alberta	19931373.0	18542.4	162615.9	33386.4	8.159	0.440	4.87
British Columbia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	19942523.0	18541.8	162867.9	33399.6	8.168	0.441	4.88

TABLE 3.3
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
LIGNITE
1989

PROVINCE/TERRITORY	QUANTITY TONNES	HEAT CONTENT kJ/kg	COST '000 \$	GENERATION GW.h	COST		
					\$/TONNE	\$/GJ	MILLS/kW.h
Newfoundland	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Prince Edward Island	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Nova Scotia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
New Brunswick	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Québec	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Ontario	1589689.0	16168.5	55290.8	2311.0	34.781	2.151	23.93
Manitoba	327715.0	16221.0	7375.4	355.8	22.506	1.387	20.73
Saskatchewan	8521448.0	14381.7	84919.4	9790.4	9.850	0.685	8.67
Alberta	0.0	0.0	0.0	0.0	0.000	0.000	0.00
British Columbia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	10538852.0	14708.4	147585.6	12457.2	14.004	0.962	11.45

TABLE 3.4
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
LIGHT OIL
1989

PROVINCE/TERRITORY	QUANTITY KILOLITRES	HEAT CONTENT kJ/L	COST '000 \$	GENERATION GW.h	COST		
					\$/kL	\$/GJ	MILLS/KW.h
Newfoundland	1805.0	38222.9	416.9	3.8	230.970	8.043	109.71
Prince Edward Island	45.0	39450.0	8.2	0.0	182.222	4.805	-----
Nova Scotia	5371.0	37802.7	995.2	16.5	185.291	4.928	60.32
New Brunswick	3893.0	38741.0	653.2	12.5	167.788	4.331	52.26
Québec	16425.0	38680.0	4053.0	45.1	246.758	6.380	89.87
Ontario	49322.0	38601.5	10950.3	165.4	222.017	5.752	66.20
Manitoba	328.0	39401.9	61.7	0.9	188.110	4.774	68.56
Saskatchewan	373.0	40420.4	53.8	1.2	144.236	3.570	44.83
Alberta	0.0	0.0	0.0	0.0	0.000	0.000	0.00
British Columbia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	77562.0	38559.8	17192.3	245.4	221.859	5.748	70.06

TABLE 3.5
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
HEAVY OIL
1989

PROVINCE/TERRITORY	QUANTITY KILOLITRES	HEAT CONTENT kJ/L	COST '890 \$	GENERATION GW.h	COST		
					\$/L	\$/GJ	MILLS/kW.h
Newfoundland	531422.0	41807.0	52087.3	2022.3	98.015	2.344	25.78
Prince Edward Island	35456.0	41362.8	4442.4	96.6	125.293	3.027	45.99
Nova Scotia	597604.0	41845.5	62965.3	2364.2	105.196	2.514	26.59
New Brunswick	1774636.0	41409.0	175462.2	7136.5	98.872	2.388	24.59
Québec	405585.0	41475.0	46223.6	1353.5	113.968	2.748	34.15
Ontario	360405.0	41660.0	63649.2	1305.2	176.606	4.239	48.77
Manitoba	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Saskatchewan	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Alberta	932.0	42450.0	75.0	2.7	80.472	1.090	27.78
British Columbia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	3708040.0	41568.2	404805.0	14281.0	106.228	2.628	28.35

TABLE 3.6
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
DIESEL OIL
1989

PROVINCE/TERRITORY	QUANTITY KILOLITRE	HEAT CONTENT kJ/L	COST '000 \$	GENERATION GW.h	COST		
					\$/kL	\$/GJ	MILLS/kW.h
Newfoundland	29852.0	38466.5	8532.5	93.2	218.830	5.689	70.09
Prince Edward Island	3245.0	38680.0	625.5	7.8	192.758	4.983	80.19
Nova Scotia	23633.0	37581.1	4287.5	67.9	181.420	4.827	63.14
New Brunswick	4172.0	39104.3	957.1	9.3	229.410	5.867	102.91
Québec	66175.0	38295.0	8222.1	220.6	124.248	3.244	37.27
Ontario	178.0	37705.0	44.7	0.5	251.124	6.663	89.40
Manitoba	6800.0	39000.0	1900.0	20.3	279.412	7.164	93.60
Saskatchewan	883.0	38000.0	204.5	2.6	231.597	6.095	78.65
Alberta	4923.0	37911.0	1045.8	16.4	212.431	5.604	63.77
British Columbia	26930.0	36145.8	6534.3	85.9	242.640	6.713	76.07
Yukon	9723.0	38680.0	2701.5	35.0	277.846	7.183	77.19
Northwest Territories	66313.0	36993.0	20251.0	210.2	305.385	8.225	96.34
Canada	242827.0	37697.6	53306.5	799.7	219.525	5.823	69.26

TABLE 3.7
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
NATURAL GAS
1989

PROVINCE/TERRITORY	QUANTITY MILLIONS m3	HEAT CONTENT kJ/m3	COST '000 \$	GENERATION GW.h	COST		
					\$/'000 m3	\$/GJ	MILLS/kW.h
Newfoundland	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Prince Edward Island	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Nova Scotia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
New Brunswick	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Québec	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Ontario	1.4	37338.7	356.2	4.4	254.429	6.923	80.95
Manitoba	0.6	37223.0	64.7	1.5	107.833	2.925	43.13
Saskatchewan	187.2	37537.9	17021.4	485.7	90.926	2.422	35.05
Alberta	1399.0	37670.7	84066.3	4420.5	60.090	1.595	19.02
British Columbia	1156.1	38481.7	68005.7	4209.8	58.823	1.529	16.15
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	2744.3	38003.0	186514.3	9121.9	61.770	1.625	16.58

TABLE 3.8
ELECTRIC UTILITIES
PROVINCIAL CONSUMPTION AND COST
URANIUM
1989

PROVINCE/TERRITORY	QUANTITY KILOGRAMS	HEAT CONTENT kJ/g	COST '800 \$	GENERATION GW.h	COST		
					\$/kg	\$/GJ	MILLS/kW.h
Newfoundland	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Prince Edward Island	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Nova Scotia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
New Brunswick	105822.0	576200.0	14391.1	5268.8	135.963	0.236	2.73
Québec	89235.0	674000.0	10208.0	4849.5	114.395	0.170	2.10
Ontario	1126915.0	707990.4	348560.5	63261.4	309.305	0.437	5.34
Manitoba	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Saskatchewan	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Alberta	0.0	0.0	0.0	0.0	0.000	0.000	0.00
British Columbia	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Yukon	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Northwest Territories	0.0	0.0	0.0	0.0	0.000	0.000	0.00
Canada	1321972.0	895148.4	373159.8	78379.7	282.375	0.408	4.96